New Zealand Journal of Agriculture

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PUBLISHED BY DIRECTION OF
THE MINISTER OF AGRICULTURE.

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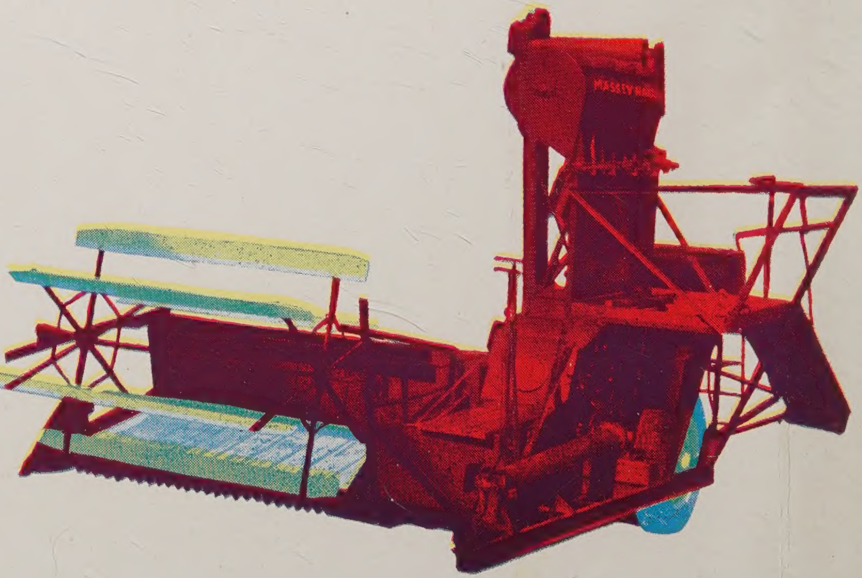


WRITE TO US FOR DETAILS!

New Zealand Journal of Agriculture

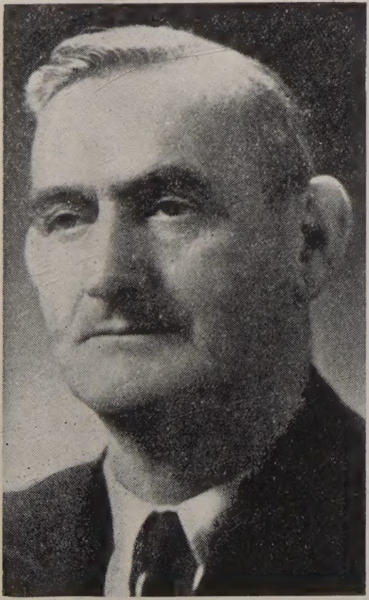
Vol. 70, No. 1. Published by Direction of Hon. B. Roberts, Minister of Agriculture. January 15, 1945.

A New Year Message to Farmers

I DESIRE to express to primary producers my best wishes for the New Year.

Further production calls will be made on farmers in 1945. Their response in the past, in spite of innumerable difficulties, has been truly excellent, and I know that the Dominion can rely on them to see the country through next season, when, in addition to supplying the needs of Great Britain and the Allied nations, the provision of food for our own people will make an additional effort necessary.

To some extent this additional effort is associated with drought conditions in Australia. We have relied on Australia for a high percentage of our wheat requirements and for grains and concentrates for stock feeding and industrial purposes. Next season New Zealand must make an effort to be self-supporting in cereals. It can be done, and I am sure the farmers of New Zealand will see that it is done. Of particular moment at the present time is the production of more wheat. We should grow 300,000 acres in 1945-46. In the 1942-43 season, under the spur of fear of invasion, we grew 287,000 acres, and during the whole war period exceeded our average peacetime acreage. Overcropping with wheat and consequent reduction in soil fertility are to be avoided, but there is still much land that could grow this crop and which has not been broken up from pasture for many years. I urge farmers to prepare now for an increased wheat acreage. In Canterbury, which produces over 70 per cent. of the Dominion's wheat, grassland should be broken up in the summer prior to deep ploughing in the autumn, and I ask Canterbury farmers particularly to push ahead with the necessary skim ploughing or surface working of pastures so that our goal of 300,000 acres of wheat will be reached.



THE HON. B. ROBERTS

In addition, we will need more oats, barley, and maize for both human and stock feed, and although I intend to go into further details on this matter at a later date, I would at this stage like to make an appeal to dairy farmers to grow special crops for stock feeding and so relieve the pressure on arable farmers. I am sure readers of this "Journal" have been interested in the articles which have appeared during the last few months detailing individual farmers' experiences in growing and feeding special crops for pigs. These articles have been of extreme value in showing how certain farmers in what are considered purely grass-farming districts have for years made a successful practice of growing crops. It would relieve the position greatly if all dairy farmers put only an acre or two under crops. In northern districts maize is ideal for dairy farmers. It is easy to grow and provides the necessary grain for pig and poultry feeding. Farmers in districts unsuitable for maize should grow barley and roots. Every dairy farmer should aim to do some cropping.

Our dairy production for 1945-46 will depend very largely on the feeding of cows next winter. We must save all the hay and silage we can this summer. Nothing should be wasted, for Britain and the liberated countries of Europe will require all the dairy produce we can export.

In addition to our efforts to extend our cereal and dairy production we must maintain our meat, potato, fruit, and vegetable output. To do this each farmer must prepare his plans well ahead.

This briefly is my message to farmers for 1945: We want more cereals, meat, and dairy produce. We cannot do our job properly by adhering to grass farming. We must plan more cropping for 1945-46. New Year greetings to you all, and "God speed the plough."

B. ROBERTS, Minister of Agriculture.

HOW TO MAKE THE MOST OF YOUR HAY PADDOCKS

★ **Cut only as much hay at a time as can be properly handled during the curing stage by the machinery and labour available.**

★ **Cut at flowering stage when the greatest weight of nutritious material will be obtained.**

★ **Provide adequate protection of the hay in stack or bales from the weather.**

Save as much hay as possible in the summer of 1944-45: greater hay production means better winter feeding and increased dairy production in the 1945-46 season.

SAVE MORE HAY

ISSUED BY THE NEW ZEALAND DEPARTMENT OF AGRICULTURE.

Farming In Greece

SOLDIERS serving overseas with the New Zealand Division have frequently been able to make close observation of the social and economic life of the peoples of occupied countries. The author of this article has recently returned to New Zealand, and he comments interestingly on Greek rural life and agriculture as observed by a soldier in the campaign in that country, and discusses possibilities of post-war rehabilitation of Greece.

ONE of the most widely-repeated remarks made by New Zealanders who "visited" Greece with the New Zealand Division in the spring of 1941 was, "Isn't it like New Zealand!" In some ways this is correct, mainly because of the similar nature of the country. Athens, the capital of Greece, is rather like Wellington in the manner in which it is situated, on a harbour and surrounded by hills.

Topography

After leaving Athens the road runs along a flat valley through olive groves and vineyards and then climbs the Daphni hills, covered with pine forests. It then descends to the plains of Thebes, and one is immediately struck by the beauty of the scene and the thought of what high-quality land there is in the valley. This valley probably does contain some of the best land in the country, but the soil is light and it is inclined to be stony and the rainfall is very low.

Flowering shrubs present a very pretty scene in springtime, as do poppies, which grow prolifically among cereal crops, but no doubt the traveller admires them far more than does the farmer, to whom they are a serious weed, which merely reduces the yield of his crops.

The plains of Thebes are narrow and do not extend for many miles, and the country becomes hilly and poor before reaching Thermopylae, where it is mountainous. Then the road drops to sea level, crosses a swampy flat, and rises to Lamia and hilly country beyond. Fertile plains extend for some miles round Larissa and are the main wheat-growing lands of Greece. North of these plains the central portion of the country becomes hilly and of very poor quality, supporting only a few sheep and goats and growing stunted fruit and olive trees. It is like this with few exceptions right up to the northern borders of Greece.

On the east coast, however, after crossing the bush- and snow-covered Mt. Olympus (9,794ft.) the road runs along a fertile coastal belt from Katerine north to Salonika and beyond.

Farming practice in Greece is very different from that to which we in New Zealand have become accustomed. Fenced paddocks, cattle grazing in herds, and modern farm implements are a recognised part of our farm economy, whereas they are practically unknown to the Greek farmer.

Soil and Climate

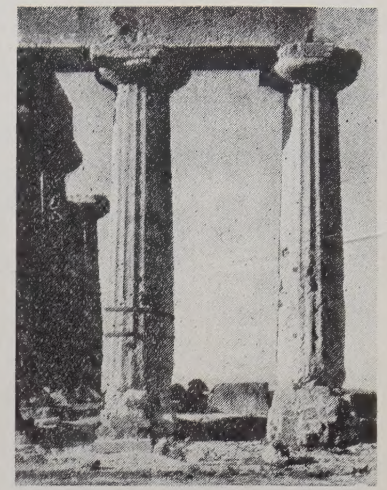
Soil and climatic conditions in Greece compare very unfavourably with those of the main agricultural countries. Hills and mountains cover 70 per cent. of the total area, and the valleys are of low fertility. The rainfall is one of the lowest in Europe, and is very unevenly distributed throughout the year, and consequently yields of staple foodstuffs are low. Figures taken from statistics of the Rome International Institute of Agriculture show that during the period 1926/30 the average yield per acre of wheat and oats was about 11 bushels, while that of barley was about 15 bushels to the acre.

By

A. C. BURGESS,

Instructor in Agriculture,
New Plymouth.

Holdings generally are very small, over 35 per cent. being less than 2 acres, while the average-sized holding is about 11 acres. The low yields and small size of holdings made the income of the farmer so low that it was insufficient to maintain his family under normal market prices. The State, in order to protect the farming community from starvation, was thus forced to raise the internal price of foodstuffs, often twice as high as that for which the same goods could be imported. The average gross income of a farmer under these conditions was 23,000 drachmas, i.e., approximately £40 sterling. This amount, less costs of seeds and fertilisers, maintenance costs, taxes, etc., was the average net income of a family of five.



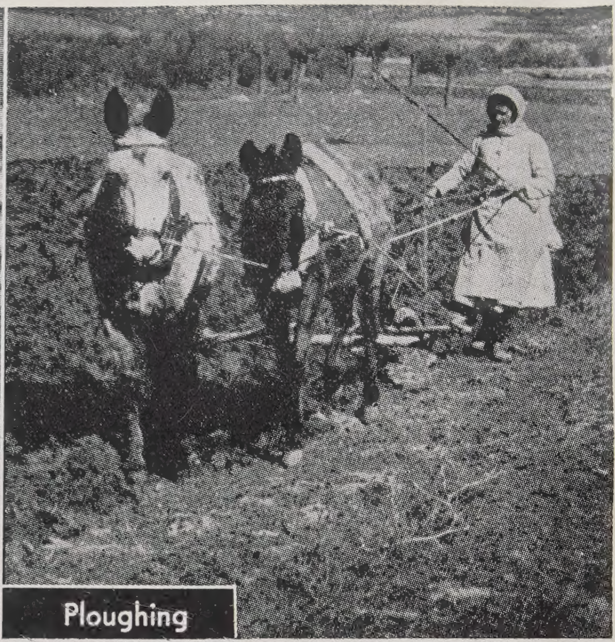
Living Conditions

Living conditions as seen by New Zealand soldiers were extremely poor. One small, 2-roomed house would probably shelter 7-8 people, perhaps three generations of one family. Furniture is often not used at all, and the entire family sleep on the floor of the living room. Hens and sheep run round the yard, while the family cow and donkey occupy a stable built as a lean-to on the house. The consumption of butter, sugar, and meat is considered a luxury, the yearly consumption of sugar being only 25lb. and that of butter less than 2lb. Fresh cheese made from goats' milk is a common item of the diet.

A typical peasant family, living in the foothills overlooking the Aegean Sea, billeted four New Zealand soldiers for a short time before the German invasion. In the family were an old man and his wife, their son and daughter aged 14 and 17, and their daughter's baby, aged about 9 months. The daughter's husband was fighting in Albania. The house had two rooms, one occupied by the soldiers, the other by the family, all of whom slept on the floor. They owned a cow and a donkey and each day mother, father, and son went off to work their land, a section of about 1½ acres near the village. The main crops grown were oats and tobacco, together with a few vegetables, producing little more than sufficient to keep the family for the year. Many peasants used to sow thistle as a vegetable, and this they gathered from among the cereal crops. Only once in three weeks did that family have meat to eat, and that consisted of a few rib bones of a sheep that had been killed and divided among several families. As it was a special meal, the soldiers were invited to share it.

Greece, like all Balkan countries, is a highly malarious area, and with the poor living conditions of the farming population malaria and tuberculosis are very prevalent.

Greek farmer



Ploughing

Typical country

Shepherd

Owing to sickness and poor crops most farmers were forced to borrow extensively from the Agricultural Bank or from private money-lenders, and it is estimated that the average farmer with an income of 23,000 drachmas was in debt to the extent of 14,700 drachmas.

Further, transport facilities inside Greece and communications with outside countries are very poor.

When we consider that the above refers to pre-war conditions, it is not difficult to realise what conditions must have been like during the past 3½ years, when imports of foodstuffs and livestock have been practically nil and while those resources which were available have been drawn on first by the German army of occupation.

Hard-Working Peasants

The peasants of Greece are very hard-working. New Zealand soldiers, when in Greece, were amazed to see children from 8-10 years old doing heavy manual labour in the fields with the older members of the family, and to see old women weighed down with heavy loads of firewood. While Greece was at war with Italy women and children were forced to work on road maintenance, in addition to working their land, as the majority of the younger men were in the army. Although the estimated figure for cultivated land is about 20 per cent., this is due to the nature of the country and not to the lack of diligence on the part of the farmer. Fertile areas on hillsides too steep for a horse and plough were cultivated by hand.

Post-war Rehabilitation

The problem of rehabilitating Greece and bringing her back to her rightful place among the nations of Europe is a very difficult one. The country has been ravaged by war, public services such as railways, roads, and harbour installations have been damaged, and, through lack of food, infant mortality has risen to an alarming figure.

The main problems which confront the United Nations in their efforts to help Greece are: What can Greece herself produce most efficiently, and therefore if her production has to be modified, what imports will be required to maintain her people on a reasonable standard of living?

A group of agriculturists in occupied Greece recently reported on the state of agriculture in the country, and the following discussion is based on their findings.

REQUIREMENTS OF GREECE FOR REHABILITATION.

1. **Agricultural machinery.**
2. **Livestock.**
3. **Machinery for irrigation.**
4. **Seeds and fertilisers.**
5. **Rebuilding roads, houses, and farm buildings.**
6. **Reclamation and drainage works.**
7. **Ships and rail transport.**

1. Even before the war modern agricultural machinery was not commonly used and now practically none is available. Ploughing was done with bullocks or mules drawing an antiquated wooden beam plough which did little more than scratch the surface. With proper cultivation and good machinery the yields of crops could no doubt be increased considerably. Tractors, ploughs, discs, harrows, rollers, and harvesting machinery will be an immediate necessity.

2. The numbers of livestock carried have always been small, due to poor pastures and poor climatic conditions. It is interesting to study the figures from the 1937 census of the numbers of various types of livestock:—

Bulls	494,925	Sheep ..	1,451,326
Cows ..	502,634	Goats ...	5,288,194
Buffaloes	66,992	Pigs	464,619
Horses ..	371,504	Asses ...	411,175
Mules ...	186,072	Poultry	13,329,903

It will be noticed that the number of bulls is nearly as great as that of cows. This is due to the common use of bulls as draught animals. Some of the cows, and the buffaloes, horses, mules, and asses are also used for draught purposes.

Another point of interest is the number of goats, which produce only a small amount of milk and are probably responsible in part for the poorness of much of the hill country. The increased use of tractors for farm work and a reduction in the number of horses, mules, and asses would allow more dairy cattle to be carried, and a reduction in the number of goats would allow more sheep to be carried on the poorer land.

Before the war the average number of cows and draught animals imported yearly to maintain the numbers carried was 100,000. As this import has ceased since 1939, and as the demands of the German army since 1941 have been heavy, there are only small numbers of inferior animals left.

3. Irrigation is considered to have great possibilities in increasing the yields of crops, as rainfall is in many cases the limiting factor. For any extensive irrigation scheme machinery for pumping would be required.

4. The soils in Greece generally are deficient in phosphate and nitrogen. Increased use of artificial fertilisers would help considerably to increase yields. Supplies of good crop seeds would also need to be made available.

5. In all the European countries which have been affected by war extensive building programmes will have to be undertaken before any large development of industries can be attempted. In many cases farm buildings and houses have been completely destroyed, and until they are rebuilt storage of produce is not possible.

6. Drainage of large areas of swamp land will be extremely useful in increasing the area of land available for cultivation, and will also have a beneficial effect on the health of the people by reducing malaria.

7. As mentioned earlier, the Greek farmer very often had to be heavily subsidised in order to give him a reasonable living, and this very often meant that prices within the country were much higher than those for which the same products could be imported. If, however, instead of trying to maintain self-sufficiency in staple foodstuffs, the policy was adopted of growing the most profitable crops, exporting the surplus, and importing her requirements of staple foodstuffs, Greek agriculture would be in a far better position.

This trade, of course, depends on the transport facilities within the country being repaired, and on shipping being available, when required, for exporting goods.

Export Possibilities

The climatic conditions in Greece are very favourable for the production of early fruit and vegetables, and if transport were available, these could be sold profitably on the British and European markets. It is estimated that 100,000 tons of fruit and vegetables could be exported during a season, and as this is a considerable increase on pre-war figures, it would be a sound economic proposition, provided storage facilities and refrigerator ships were available.

Tobacco is probably the crop which is most suited to Greek conditions. It can be grown on soils of medium fertility, and under low rainfall conditions. Statistics show that the income per acre from tobacco is five times as great as the average income from all other crops. Considerable expansion of the tobacco industry could take place without competing with other crops for the more fertile land.

Greece cannot compete with other European countries in the production of cereals, but she was forced to increase her production in the years prior to the war. Often internal prices of cereals were three times international prices. Much of the land now growing cereals is much too poor for good crops and is better suited to some crop such as tobacco.

The production of wine, sultanas, and currants supplies an important source of income to the Greek farmer, and could profitably be increased. Soil and climate are very favourable, returns per acre are high, and the industry absorbs a large amount of labour.

The eastern coastal regions and the surrounding islands are very well suited to citrus production, and the industry might well be expanded in these areas. Prior to the war there was quite a good though small export trade in citrus fruit.

In the 20 years prior to the war the cotton industry in Greece increased nearly sixfold, and still further expansion is considered possible. Yields are among the highest in the world, and the industry would absorb large numbers of the population. The neighbouring Balkan countries cannot produce cotton themselves, owing to climatic conditions, and thus a ready market for Greek cotton should be assured.

Olive trees are common all over Greece and flourish both in rich and poor soils of the mountains and plains. Olives and olive oil are two of the staple foods of the population. Olive products average about 15 per cent. of the total agricultural production, and there was quite a good export trade in olives and olive oil prior to the war.

From the foregoing it can be seen that Greece is not suited, by reason of her soil and climatic conditions, to grow high-producing crops in competition with other European countries, but she can produce and is already producing some crops whose yields compare very favourably with those of any other country in the world. It is on the production of these crops that she should concentrate.

An important consideration in the rehabilitation of Greece is the problem of reducing her large amount of unemployment. The crops which are most suitable to the country, e.g., tobacco, grapes, cotton, and citrus fruit, all require a large amount of labour for their proper cultivation, and thus an increase in the areas planted with these crops would help considerably to relieve unemployment.

New Zealand's trade with Greece prior to the war was very small. The principal item of export was wool, and the main imports were currants and olive oil. It is not likely that trade between Greece and New Zealand will ever be on a very large scale.

◆

Pig Industry Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in February as follows:—

Auckland.—1YA on February 21, at 7.15 p.m., "Care of the Sow Between Weaning and Farrowing," by H. H. Preston, Supervisor, Northland District Pig Council.

Dunedin.—4YA on February 12, at 7.15 p.m., "Feed Values and How to Assess Them," by H. McDonald, Supervisor, Otago District Pig Council.

Napier.—2YH on February 8, at 7.15 p.m., "Diseases of Pigs," by A. D. M. G. Laing, M.R.C.V.S., Department of Agriculture, and I. H. Owtram, Supervisor, Tairawhiti District Pig Council.

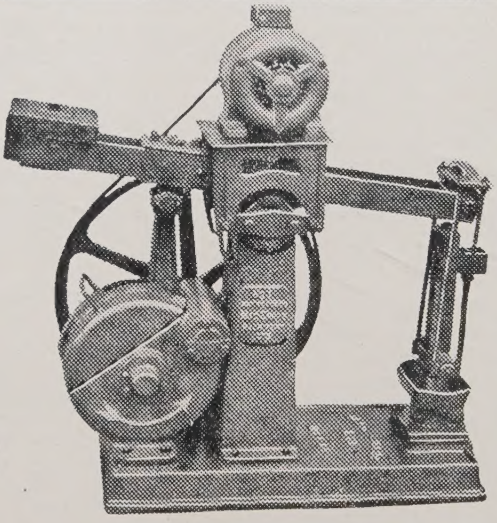
Palmerston North.—2ZA on February 20, at 8.30 p.m., "Concrete for Piggeries," by L. Marsdon, Supervisor, Wellington District Pig Council.

◆

Bushel Weights in Common Use

						No. bushels per sack.
Barley ..	50lb.	reckoned	to	the	bushel	4
Beans ..	65lb.	"	"	"	"	3
Bran or Pollard	20lb.	"	"	"	"	7 to 10
Maize ..	56lb.	"	"	"	"	3½
Oats ..	40lb.	"	"	"	"	4
Peas ..	60lb.	"	"	"	"	3½
Ryecorn	54lb.	"	"	"	"	3½
Wheat	60lb.	"	"	"	"	3
Ryegrass	20lb.	"	"	"	"	6

When any of the above grains are ground to a feed meal the bulk is thereby greatly increased and the reckoned bushel weight considerably decreased.



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Lambing Estimates For 1944

Record Dominion and South Island Figures

Contributed by the LIVESTOCK DIVISION.

THE lambing percentage estimate for 1944, 91.79, is the highest yet recorded for the Dominion.

The South Island returns have retained their consistent position ahead of those from the North Island, and the South Island 1944 percentage is the highest on record, while the figures for both islands show a marked improvement on the previous year's, when the Dominion figures dropped below 90 per cent. after three seasons of exceeding that figure.

The figures reflect conditions over the Dominion generally, as it is accepted that a high lambing percentage is a direct result of a more than usually favourable autumn, followed by mild weather during winter and actual lambing.

County.	Breeding Ewes.	Estimated Percentage of Lambs.	Estimated Number of Lambs.
AUCKLAND DISTRICT.			
Mangonui	36,179	88.4	31,982
Whangaroa	13,850	85.8	11,883
Bay of Islands	65,452	86.6	56,681
Hokianga	55,491	83.1	46,113
Whangarei	100,471	87.1	87,510
Otamatea	83,385	86.2	71,877
Hobson	80,487	92.31	74,297
Rodney	91,876	84.92	78,021
Great Barrier	7,546	79.14	5,971
Waitemata	77,129	91.86	70,850
Eden	2,667	87.65	2,337
Manukau	63,313	84.72	53,638
Franklin	99,240	98.25	97,503
Coromandel	42,456	74.32	31,553
Thames	8,594	81.00	6,961
Hauraki Plains	13,479	90.65	12,218
Ohinemuri	13,637	89.22	12,166
Waikato	149,263	96.59	144,173
Raglan	353,322	86.77	306,577
Waipa	170,982	97.75	167,134
Piako	128,223	96.42	123,632
Matamata	244,378	97.07	237,217
Rotorua	83,349	95.58	79,664
Taupo	19,874	89.36	17,759
Taumarunui	106,904	87.89	93,958
Kawhia	68,907	88.33	60,865
Otorohanga	129,715	90.00	116,743
Waitomo	340,095	86.68	294,794
Ohura	107,336	95.30	102,291
Kaitieke	68,417	82.00	56,101
Tauranga	121,242	92.91	112,645
Whakatane	45,157	89.00	40,189
Opotiki	56,502	75.00	42,376
Totals	3,048,918	90.12	2,747,679

County.	Breeding Ewes.	Estimated Percentage of Lambs.	Estimated Number of Lambs.
EAST COAST-HAWKE'S BAY DISTRICT.			
Matakaoa	62,376	81.97	51,130
Waiapu	250,782	82.81	207,673
Uawa	124,339	87.42	108,897
Cook	445,937	90.29	402,637
Waikohu	358,445	84.80	303,961
Wairoa	410,244	87.32	358,225
Hawke's Bay	976,465	87.48	854,211
Waipawa	414,718	95.70	396,885
Waipukurau	140,327	93.63	131,388
Patangata	493,142	92.29	455,120
Weber	56,937	90.25	53,822
Dannevirke	279,905	92.00	257,513
Woodville	86,372	95.00	82,053
Pahiatua	154,543	92.75	143,338
Akitio	146,147	84.00	122,763
Totals	4,400,679	89.30	3,929,616
WEST COAST-WELLINGTON DISTRICT.			
Clifton	90,212	85.19	76,851
Taranaki	27,731	96.17	26,668
Inglewood	54,448	88.96	48,436
Egmont	18,778	93.34	17,527
Stratford	99,873	94.30	94,180
Whangamomona	52,556	87.00	45,723
Eltham	52,678	92.83	48,900
Hawera	80,459	99.71	80,225
Waimate West	5,943	94.65	5,625
Patea	201,361	93.00	187,265
Waitotara	130,224	88.50	115,248
Waimarino	174,007	85.00	147,905
Wanganui	255,657	86.90	222,165
Rangitikei	945,161	93.00	878,999
Oroua	194,450	98.70	191,922
Kairanga	108,365	95.60	103,596
Kiwitea	248,623	96.38	239,622
Pohangina	125,440	98.70	123,809
Manawatu	132,900	99.30	131,969
Horowhenua	115,471	94.18	108,750
Hutt	67,167	84.21	56,561
Makara	46,601	80.69	37,602
Featherston	321,381	89.00	286,029
Wairarapa South	161,211	87.00	140,253
Masterton	296,324	82.00	242,985
Castlepoint	95,249	85.00	80,961
Eketahuna	143,903	86.00	123,756
Mauriceville	45,150	79.00	35,668
Totals	4,291,323	90.86	3,899,200

County.	Breeding Ewes.	Estimated Percentage of Lambs.	Estimated Number of Lambs.
MARLBOROUGH-NELSON-WESTLAND DISTRICT.			
Waimea	166,738	76	126,721
Takaka	26,477	82	21,711
Collingwood ..	13,797	82	11,314
Buller	2,060	93.1	1,918
Inangahua	14,799	98.8	14,621
Murchison	30,073	94.6	28,499
Grey	23,856	106.1	25,311
Westland	35,257	109.1	38,465
Sounds	101,135	74.28	75,123
Marlborough ..	194,944	81.12	158,139
Awatere	161,921	73.20	118,526
Totals	771,057	80.45	620,348
CANTERBURY-KAIKOURA DISTRICT.			
Kaikoura	131,478	79	103,868
Amuri	211,733	74	156,682
Cheviot	137,323	91	124,964
Waipara	276,856	88.7	245,571
Ashley	64,808	86	55,735
Kowai	71,301	92	65,597
Oxford	75,188	90	67,669
Rangiora	36,101	101.3	36,570
Eyre	49,289	104.7	51,606
Tawera	50,538	82.2	41,542
Malvern	121,947	102.4	124,874
Paparua	35,856	112.5	40,338
Waimairi	3,144	104.1	3,273
Heathcote	7,387	106.5	7,867
Akaroa	81,989	104	85,269
Mt. Herbert	38,963	102	39,742
Wairewa	69,394	103	71,476
Halswell	15,224	89	13,549
Springs	29,945	112	33,538
Ellesmere	76,461	105	80,284
Selwyn	147,945	77.5	114,657
Ashburton	676,256	98.6	666,788
Geraldine	222,581	97	215,904
Levels	143,651	115	165,199
Mackenzie	279,542	88.5	247,395
Waimate	424,314	98	415,828
Chatham Islands ..	39,476	73	28,817
Totals	3,518,690	93.92	3,304,602
OTAGO-SOUTHLAND DISTRICT.			
Waitaki	427,100	95	405,745
Maniototo	235,175	87.1	204,837
Vincent	255,317	88	224,679
Waihemo	97,545	89	86,815
Waikouaiti	69,894	87	60,808
Taieri	166,526	76	126,560
Peninsula	16,050	90	14,445
Clutha	389,488	95.1	370,403
Tuapeka	327,341	90	294,607
Bruce	207,185	95	196,826
Lake	127,247	84	106,887
Southland	1,623,368	106	1,720,770
Wallace	574,737	95.1	546,575
Stewart Island ..	2,076	80	1,661
Totals	4,519,049	96.52	4,361,618

DISTRICT ESTIMATES.

The following table gives the estimates for the current (1944) season's lambing for the several sheep districts:—

District.	Number of Breeding Ewes.	Estimated Percentage of Lambs.	Estimated Number of Lambs.
Auckland	3,048,918	90.12	2,747,679
East Coast-Hawke's Bay	4,400,679	89.30	3,929,616
West Coast-Wellington	4,291,323	90.86	3,899,200
Marlborough-Nelson-Westland ..	771,057	80.45	620,348
Canterbury-Kaikoura	3,518,690	93.92	3,304,602
Otago-Southland ..	4,519,049	96.52	4,361,618
Dominion ..	20,549,716	91.79	18,863,063

Dominion Totals

The following table shows the estimated lambing for the North and South Islands for the previous five years, together with the actual number of lambs tailed:—

Year.	Number of Breeding Ewes *(as at 1941).	Estimated Percentage of Lambs.	Estimated Number of Lambs.	Actual No. of Lambs Tailed.
NORTH ISLAND.				
1944 ..	11,740,920	90.08	10,576,495	—
1943 ..	*11,268,384	87.18	9,823,748	10,687,876
1942 ..	*11,268,384	89.95	10,134,505	10,835,934
1941 ..	*11,268,384	90.74	10,224,786	10,593,291
1940 ..	10,917,684	89.01	9,717,488	10,348,649
1939 ..	10,889,802	84.40	9,190,994	9,476,647
SOUTH ISLAND.				
1944 ..	8,808,796	94.07	8,286,568	—
1943 ..	*8,762,549	89.16	7,813,548	7,734,060
1942 ..	*8,762,549	93.34	8,179,674	8,028,958
1941 ..	*8,762,549	91.60	8,026,076	7,929,999
1940 ..	8,809,973	91.69	8,078,518	8,037,123
1939 ..	9,070,497	86.29	7,826,601	7,752,922
DOMINION.				
1944 ..	20,549,716	91.79	18,863,063	—
1943 ..	*20,030,933	88.05	17,637,296	18,421,936
1942 ..	*20,030,933	91.43	18,314,179	18,864,892
1941 ..	*20,030,933	91.11	18,250,862	18,523,290
1940 ..	19,727,657	90.21	17,796,006	18,385,772
1939 ..	19,960,299	85.26	17,017,395	17,229,569

HAY FOR AUSTRALIA

OWING to the drought in Australia the milk supplies to the large centres, such as Sydney, have been threatened, and it is expected that unless the feed position is eased dairy farmers will not be able to maintain full milk supplies next winter. New Zealand farmers are being called upon to supply a large quantity, running into several thousand tons, of good quality hay for export to Australia.

TESTING RYEGRASS SEED

IN certain districts each year considerable quantities of perennial ryegrass seed are harvested, which, on testing for germination, are found to be so poor as to be practically valueless. Farmers in such districts can avoid much needless expense if before harvesting they submit samples of the crop to the Seed Testing Station, Palmerston North. Detailed instructions for collecting samples appeared in the "Journal of Agriculture," December, 1942.

STUDIES IN FARM MANAGEMENT

A Northern Wairoa Farm

DRAINED alluvial river flats are the most productive areas found throughout North Auckland. These areas carry rich paspalum-white clover or paspalum-ryegrass-white clover pastures. Over 75 per cent. of the milking cows in the northern peninsula are grazed on the pastures on river flats. In addition, the pastures provide luscious feed for the fattening of beef cattle reared on the hill country.

THE areas of flat alluvial land in North Auckland vary in size from patches of a few acres to stretches thousands of acres in extent. The total area as estimated by the Soil Survey Division of the Department of Scientific and Industrial Research covers 216,000 acres. The soils are divided broadly into two major types: the clay flats or meadow soil areas covering 131,300 acres, and the remainder, which are more recently formed soils of more diversified types, extending over 84,700 acres. Considerable areas of river flats are found in the river valleys entering the Awanui, Mangonui, Whangaroa, Hokianga, and Kaipara Harbours, and elsewhere, as at Waipu. The largest single area is the Ruawai Flats, of approximately 33,000 acres, adjacent to the Northern Wairoa River. However, on this river are further areas extending over 34,000 acres. These 67,000 acres, together with the adjacent hill land, comprise the Northern Wairoa district.

NORTHERN WAIROA DISTRICT.

The Northern Wairoa district embraces the whole of the Hobson County, and the north-western portion of the Otamatea County. It stretches from Donnelly's Crossing in the north to the Kaipara North Head and Matakohe in the south. From Tangiteroria in the east it extends to the coast in the west. The area covers a region of hills and dales, of gum hills and river flats. No great mountains with their accompanying deep valleys exist. Above the river flats on the east rise rolling hills of claystone, sandstone, and limestone. On the west, between river flats and the sea, lie hills of consolidated sand.

The predominating feature of the area is the Northern Wairoa River. Tidal and navigable for a distance of over 60 miles, the river, now as in the past, greatly influences both settlement and farming. Until about 15 to 20 years ago, when existing roads were improved and many new roads formed, the river provided the only means of ingress and egress to the district. Further, it provided the means of transport and communication within the area. The ring of the bushman's axe, the screech of the timber mills' saws, the whine of the flax stripper, and the dull crunch of the gumdigger's spade or spear sounded widely throughout the district. No demand existed for farm produce, except that obtained from a few acres of cultivation, a beast or two, and some pigs. In time settlers took over worked-out timber land, cleared the stumps, drained the swampy flats, grew pasture and grazed sheep for their wool and cattle for their hides and tallow. Later dairying was undertaken. Kegs of salted butter were shipped to Auckland. About 1896 several small cheese factories were erected and the first small shipment of cheese was made from Ruawai. In 1870 the first sheep in any considerable number were introduced, 2,000 being brought overland from Hawke's Bay. But at the close of the century little further had been accomplished. Sheep and cattle products provided the major source of the farm income. The dairy industry had languished.

By

E. H. ARNOLD,
Instructor in Agriculture,
Whangarei.

With the advent of the cream separator and the refrigerator, dairying revived and developed vastly. In 1902 the Northern Wairoa Dairy Factory at Dargaville manufactured 64½ tons of butter. This past season 3401 tons were produced. In 1916 the factory at Ruawai made 160 tons of cheese, equivalent to approximately 64 tons of butter. This past season the production of this latter factory was 1722 tons of butter. In 1902 the district produced 64½ tons and 42 years later 5123 tons. And this is less than one quarter of the estimated potential future production.

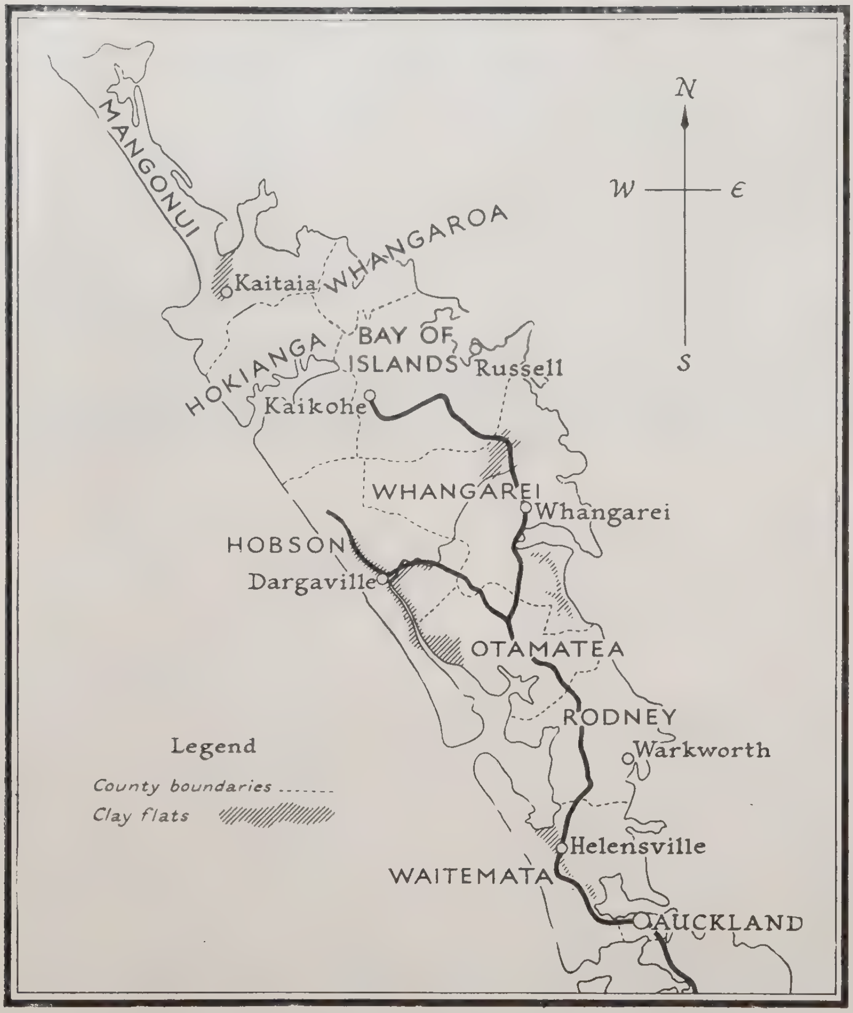
Today the river has little part in transport. Direct rail connection as well as quite good roads provide communication to the district. Many miles of all-weather roads have been formed throughout the area. Motor lorries have replaced the cream launches of former days. Electric power was introduced as late as 1937.

The Climate

The average annual rainfall recorded at Dargaville over the past 21 years is 46.95in. This was distributed on the average each month as follows:

	Inches.		Inches.
January ..	4.90	July	6.11
February .	3.28	August ...	4.50
March	2.16	September	3.56
April	3.58	October ..	3.27
May	4.66	November	2.59
June	5.45	December	2.87

These figures would indicate that the rainfall for the summer months should be sufficient for continued good pasture growth. However, the usefulness of any rainfall depends not only on the total precipitation, but also on its incidence. In some seasons little rain has fallen from November to



Map showing distribution of clay flats in North Auckland.

April. During other summers the rainfall is made up of short periods of heavy rains, interspersed with long rainless spells of high temperatures. Occasionally a wet summer with many wet days each month occurs. Spring conditions are not reliable. The variation from a long, cold, wet spring to one short, mild, and of moderate rainfall may occur during consecutive seasons. In fact it is a truism to state that no two seasons are alike, and that there is no average season in the district. However, the climate generally is ideally suitable for all-the-year-round pasture growth of the paspalum-ryegrass-white clover sward which is found par excellence on many Northern Wairoa farms. Although climatic factors do influence the seasonal production of pasture, other decisive factors are present which prevent the climate being exploited to the full.

The Soils

The river flat soils consist of approximately 46,000 acres of alluvial heavy clay loams and 21,000 acres of more recent river alluvials. The latter soils vary considerably, due to wide variety of hill country from where they have been washed down during floods. Soils formed from the alluvium from volcanic hills such as those in the Kaihau Valley at Maropui and Mamaranui are of high fertility on which paspalum pastures predominate. Soils formed from debris of the limestone country are quite good, but those from that of the sandstone and claystone hills are generally poorer. Many areas of peat are found, particularly in the short valleys leading off into the sandstone hills.

The larger area of grey-flecked heavy clay loams has been built up by fine silty material deposited in the tidal reaches of the Northern Wairoa River. They are typical meadow soils or ground water soils; the water-table is high and rises to or near the surface in many places during the wetter months. Excessive wetness in the winter and early spring months occurs. When insufficiently drained and badly poached or pugged by stock they lose their desirable crumb structure and while wet become a tenacious mass unable to maintain good pasture plants. In season pugged areas become a sea of yellow buttercup. Upon drying out in the summer they crack and open up badly. When adequately drained they possess a most desirable crumb structure and will carry a vigorous paspalum-ryegrass-white clover sward which prevents opening up under dry conditions. The soils of the hills between the flats and sea are sandy loams. Near the coast are small narrow areas of recently stabilised sand dunes possessing a soil of 5 to 6in. of light sandy loam above free-running sand. Next is a stretch one to three miles wide of reddish sandy loams overlying a consolidated sub-soil. Between this area and the river flats are the sandy gum lands, hills stretching for many miles and up to five miles wide. The soil is badly leached and an iron podsol soil has developed. Below 12 to 18in. occurs an ironstone hard pan which prevents drainage, making the sandy loam on these hills wet in winter and dry in summer. On the eastern side the hills range from sandy clay loams to heavy clay gum lands. A large area consists of limestone soils of high fertility. In the northern area near Kaihu poor dry soils of basalt volcanic derivation occur.

Drainage Requirements

The heavy clay loams of the flats are rather difficult to handle. Much of the land is low-lying, and tidal water interferes with efficient drainage. Naturally the soil of so large an area has variations in texture. These depend on the proportion of very fine clay in the soil, the variation in depth and quality of the darker top soil overlying the clay subsoil, and the height above or below the river level at high tide. These variations were indicated by the different types of natural cover, such as raupo, flax, manuka, cabbage trees, puriri, white pine, and rimu. The first step was the working over of the profitable areas of bush by the timber mills. The initial development into farms consisted of drainage.

Efficient drainage is definitely the first and foremost requirement in the successful establishment and maintenance of good pastures on these flats. Without it white clover and English grasses will not grow. Even paspalum will not thrive in excessively wet fields. Little or no drainage results in rushes and raupo; partial drainage restricts the pasture growing season, making the land suitable only for summer fattening areas; while efficient drainage permits profitable dairying.

The main outlet drains, together with stopbanks and flood-gates, have been put in by the Local Drainage Branch of the Lands and Survey Department, drainage boards, groups of settlers, and individual farmers. These form the basis for individual farm drainage by means of open drains. Where drains were put in before there was much heavy stocking of the land, and where they are deep, and the water gets away rapidly to and through efficient outlets, a complete system of these, together with small paddocks, has proved fairly effective in keeping the land dry in normal winters. But there are always portions of paddocks from which the surface water is not removed quickly enough to permit of stocking. Deep and numerous open drains are objectionable, in that overdrainage occurs in the summer, and cleaning and maintenance prove costly.

Thorough drainage, which means maintaining the water level sufficiently below the surface, rapidly removing the harmful excess water from heavy rains, together with keeping the level of water within the reach of the roots of pasture plants as long as possible during dry weather, is obtained only by combining a system of comparatively shallow, open drains leading to an effective outlet drain to carry off flood waters with a system of underground drains to remove the water rapidly from the surface soil and lead it to open drains. With such a system the pastures are earlier, topdressing and harrowing more effective, poaching of the surface considerably reduced, weeds such as buttercups and rushes suppressed, and the effects of drought in drying-out pastures lessened.

For efficient underground drainage tiles are undoubtedly the best, but practically no tiling of land has been carried out on the Northern Wairoa flats. This aspect of drainage must, when labour and finance permit, be given very serious consideration. In the past on some areas very effective drains of manuka fascines have been installed with good results. Where the work has been well carried out they have proved fairly permanent. To-day the cost of obtaining suitable manuka (now scarce) and constructing the drains proves as much as laying tile drains. Over the past 15 years considerable areas have been improved in drainage by the mole-drain plough. Varied results have been obtained. While on some areas mole draining has solved the problem of underground drainage, on other areas much money has been wasted. Poor and mediocre benefits have resulted from the failure to clear all roots and stumps, to give the surface of fields some preliminary grading, to avoid drawing the mole across depressions and blind creeks, to provide effective outlets to each conduit, and properly to connect up two mole drains when they cross each other near the outlets. Further, poor results obtain when the work is performed at the wrong time. However, while certain areas do not lend themselves to effective mole-draining, many farmers have made good use of the mole-drain plough. An effective system of mole drains 9 to 12ft. apart costs 12/- to 15/- per acre, and even if they last only four years, the work proves worth while.

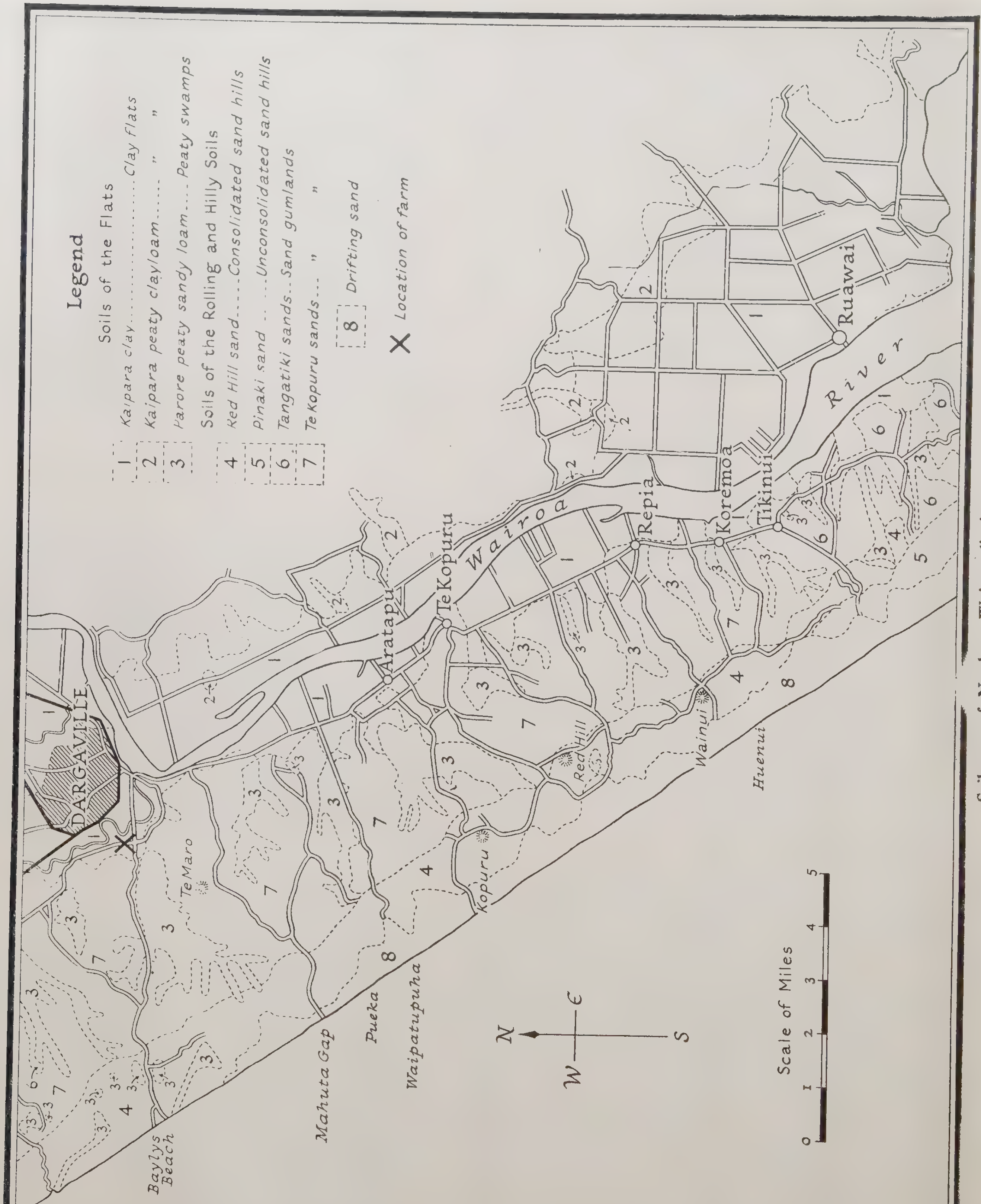
Pasture Establishment

Following the initial drainage work, the earlier farmers, after cutting down the remaining bush and scrub, burned off and surface sowed the land. In those days certified seeds were not available, and seed mixtures varied greatly. Where drainage was poor or inadequately maintained pastures deteriorated rapidly and were replaced by rushes and other swamp plants. Where drainage was fairly good, but grazing management poor, tall fescue, a constituent of most mixtures sown, took charge. With the spread of paspalum, also included in many early seed mixtures, followed later by the gradual decay of the softer timber, the clearing of stumps and logs of puriri, the levelling of the surface, oversowing with perennial ryegrass and white clover, liming and topdressing, harrowing and topping with the mower, many thousands of acres of high-producing paspalum-ryegrass-white clover pasture have been established. At one time maize for grain occupied several thousand acres of the flats. In addition, supplementary fodder cropping was practised. To-day maize growing is confined to small areas for grain for pig feeding on the farm, and fodder and root crops are a rarity. After cropping the land was ploughed and sown down to pasture. Results varied. Where poor seed and unsuitable seed mixtures were used the pastures had only a short life. Where cultivation was insufficient and liming and fertilising inadequate pastures

Hoanga Flats.

Winter run-off country.

Beef cattle.


Legend
Soils of the Flats
1 Kaipara clay..........Clay flats
2 Kaipara peaty clayloam...... " "
3 Parore peaty sandy loam.... Peaty swamps
Soils of the Rolling and Hilly Soils
4 Red Hill sand.....Consolidated sand hills
5 Pinaki sand .. ...Unconsolidated sand hills
6 Tangatiki sands.. Sand gumlands
7 Te Kopuru sands... " "
8 Drifting sand
X Location of farm
DARGAVILLE
Aratapu
Te Kopuru
Repia
Koremoa
Tikinui
Ruawai
Wairoa River
Red Hill
Wainui
Huenui
Kopuru
Te Maro
Mahuta Gap
Pueka
Waipatupuha
Baylys Beach
N
E
S
W
Scale of Miles
0
1
2
3
4
5

Soil map of Northern Wairoa district.

did not establish properly and were difficult to maintain. The resulting pastures became paspalum dominant.

"Paspalum Farm" and Wintering-off

The paspalum dominant pastures, and, to a much larger extent, the inadequacy of the drainage of the heavy soils of the flats brought about during the wetter months the practice of wintering-off the stock on the adjacent hills. Paspalum does remarkably well on the river flats and will withstand flooding for several weeks at a time. Paspalum has proved an excellent pioneer in bringing in this alluvial land. It requires, however, high soil fertility for maximum production. On adequately drained land it combines well with ryegrass and white clover, but requires careful management of grazing, harrowing, and topping. Where drainage is poor and management inefficient the dominant paspalum sward results. Practically all farms on the flats winter the stock off on the hills. On the rank summer and autumn growth of paspalum the cows are grazed during the early winter. When this is finished and the land is becoming wet the stock are moved off to the adjacent hill country. This is usually surface-sown country, and may be limestone hills in cocksfoot and ratstail, or sandstone hills in danthonia and browntop. Where the farms are immediately adjacent to the hills the one farm usually embraces both types of land. Where the farm is wholly on the flats grazing areas are rented, but usually a second farm is held for a winter run-off. On the hill area the summer and autumn growth is ungrazed, and this provides pasturage in the form of natural, uncut, but poor-quality hay. Here the cows remain until calving time. A study of information obtained from the Northland Herd Improvement Association shows that of the dairy cows grazed on the flats 5 per cent. have calved before or are being carried over at July 1, 12 per cent. calve in July, 42.5 per cent. in August, 25.5 per cent. in September, and the remaining 15 per cent. later in the season.

Although the system of wintering-off has increased total production, it has some radical weaknesses. In general, the hill country pasturage is not the best feed for in-calf cows. Digestive troubles, mainly through impaction, occur. Some farmers are improving the position by making hay on the hills for feeding during the winter, or by carting baled hay from the flats to the winter run-off. Although calving dates are later than in many other districts, if the spring is wet, the surface of the fields cuts up badly even after the cows are brought down on to the flats. There is a definite shortage of feed for newly-calved cows in the spring months, August to October. It is normally expected that a cow will come into full production within six to eight weeks after calving. The peaks of butter production at both the Ruawai and Dargaville factories do not occur until mid-December. Paspalum does not commence growth until October and even December in some seasons. Paspalum is a good servant, but a bad master. When dominant and especially when allowed to become rank the growth is unpalatable and, in many cases, indigestible to stock. When kept short through topping, together with white clover, the pasture produces a succession of leafage ideal for milking cows. Rank paspalum suppresses white clover. In dominant dense paspalum swards ryegrass is not found. Clovers must be present to supply cheap and effective nitrogen to the grasses, and to balance the feed to provide a better milk-producing ration. Ryegrass is necessary along with cocksfoot and white clover to provide stock grazing until the paspalum takes up the running in November or December. Improvements to pastures on many farms have taken place in the past decade, but considerable work is required to cover the whole of the flats with the desired combination of paspalum, ryegrass, and white clover. The first and most important step is improved drainage. Then follow ploughing and resowing of a suitable pasture mixture or the oversowing of ryegrass and white clover; better management including topping and harrowing; and adequate topdressing.

Maintenance of Pastures

Sub-division of fields and rotational grazing, although recognised as necessary, are possibly not adequate. Control of paspalum pastures requires small fields. Topping with the mower, performed fully on some farms, is generally insufficient on others to avoid and control rank growth. Harrowing of pastures is not general. Topdressing pastures has extended slowly. All the river-flat soils require lime in abundance. During recent years liming has received an impetus. Lime works on the limestone hills adjacent to the flats show remarkable increases in output. The soils require phosphates. Basic slag proved very popular when available, but superphosphate gave good responses only with adequate liming. Potash does not give responses; apparently liming assists in releasing sufficient from the clay portion of the soil. Full results on many areas are not obtained from topdressing, due to poor drainage and the rank growth of paspalum.

Hay and Ensilage

The conservation of surplus pasture into hay and ensilage is not a strong feature of Northern Wairoa farming. This, no doubt, is due to the practice of wintering-off, a major factor in reducing the amount of hay and ensilage made. It has been ascertained on many occasions that 12 to 15cwt. of hay or its equivalent is required per cow for feeding over the winter period. In 1941-42, if all the hay made had been fed to milking cows only, each

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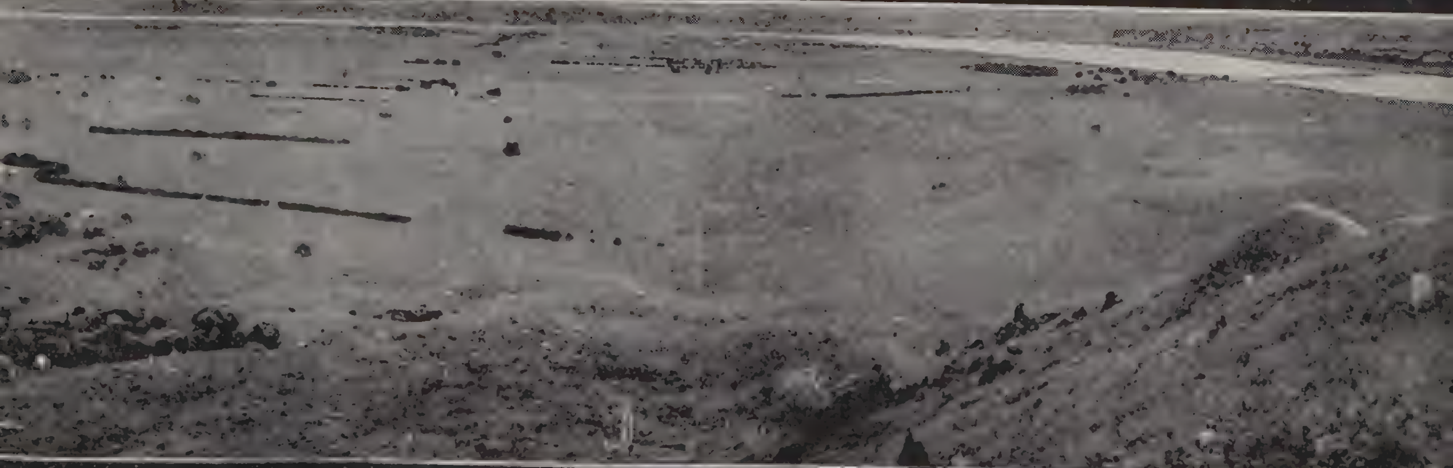
NORTHERN WAIROA DISTRICT

Turiwiri Flats and Dargaville.

Ruawai Flats from Rehia Hills.



Maropui-Mamaranui Flats, Kaihu Valley.

cow in the Hobson County would have received 3¾cwt., and each cow in the Otamatea County 2½cwt. over the winter period. It must be remembered that it is being assumed that dairy cows only received all the hay. Other cattle were carried and these received some portion of the hay crop. Even with the feed available on winter run-offs, a serious deficiency in adequate winter feed for stock is revealed. In general, stock are not well wintered and the feed provided could well be doubled. Ensilage has not been taken into these calculations. In 1941-42 only 296 tons was made in the two counties. This is far from sufficient to provide supplementary feed for a dry summer or when the paspalum becomes rank.

Cropping

Small areas of turnips are grown for summer and autumn feeding of milking cows. Occasionally a few acres are sown to green cereals for early spring feeding. At one time maize for grain was an important cash crop on the flats. Yields of 80 to 100 bushels per acre were common. With low prices and the increase in paspalum pastures, greater profits were to be obtained from dairying. The maize crop now occupies less than 400 acres, about half of which is harvested for grain and fed to pigs on the farm. Prairie Queen, Ninety Day, and Johannsen's White are the chief varieties.

Cattle

Although Shorthorn cattle formed the foundations of the early dairy herds, Jerseys now predominate. In some herds Shorthorn blood is still evident. Odd herds of Ayrshires and Friesians are found. In recent years considerable improvement has been brought about by the introduction of pedigree bulls of proved production strain. Average cow production is not high. The feed conditions throughout the year are unfavourable for maximum production. The majority of farmers must cull on disease; not on cow production. This fact cancels out to a great extent the advantages of good breeding. Further, it is no doubt the reason that only 10 per cent. of suppliers to the Northern Wairoa and Ruawai factories test their cows.

Certain areas of the flats are utilised for the summer grazing of beef cattle. Herefords and Shorthorns predominate, but quite a number of Black Polls are seen. Stores are brought down off the hill runs to be finished off on the luscious paspalum-white clover pastures on the flats. These flats are suitable for, and in time may become notable for, the rearing of chilled beef. In fact, until drainage conditions are greatly improved many areas of the flats are more suitable for fattening stock than for dairying.

Pigs

Just as district characteristics affect the butterfat production of the area, so do they influence pig production. Almost entire reliance is placed on skim milk for feeding pigs. Some district farmers purchase sufficient but economical amounts of meals, especially for feeding brood sows and sows with litters before the flush of skim milk occurs. In recent years more attention has been given to the growing of small areas of crops, especially maize and, to a lesser extent, pumpkins. English Berkshires and Tamworth, together with all degrees of crosses, account for over 90 per cent. of the pigs kept. Large Whites with a few Large Blacks comprise the remainder. The Tamworth boar, mated to the Tamworth-Berkshire sow, is popular and does well.

District breeding practice aims to have only breeding pigs on the farm during the winter and early spring. The more successful farmers arrange the first farrowing in late May and June, with a second in late November and December. The first litters are turned off at seven months as baconers, and the second at good porker weights with a few pigs at baconer weights. In general, however, the first farrowings occur about August, the pigs of which are sold at heavy baconer weights after eight months' feeding. The second litters arrive during February-March. The resulting pigs are usually found as poor light stores or weaners in May. They are quitted at any price if possible, and if not sold, are allowed to take their chance under starvation conditions. On many farms such second litter pigs make the financial returns less than if no second farrowings occurred.

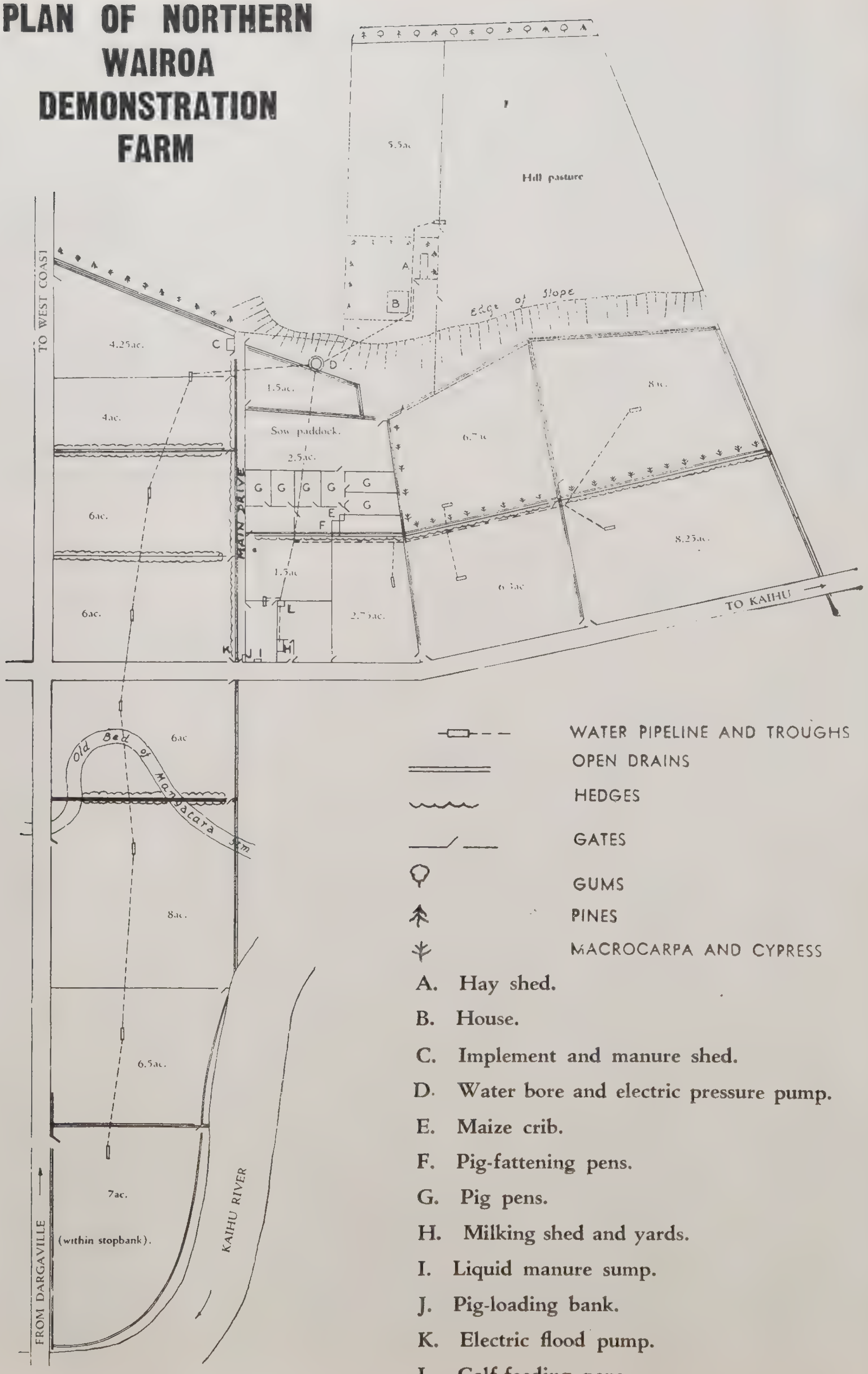
VIEWS OF THE FARM

Dairy herd.

Calves.

Ensilage stack.

PLAN OF NORTHERN WAIROA DEMONSTRATION FARM



A. Hay shed.
B. House.
C. Implement and manure shed.
D. Water bore and electric pressure pump.
E. Maize crib.
F. Pig-fattening pens.
G. Pig pens.
H. Milking shed and yards.
I. Liquid manure sump.
J. Pig-loading bank.
K. Electric flood pump.
L. Calf-feeding pens.

View of Demonstration Farm.

Time, feed, and energy are spent for a loss. Few of these late second litters survive, and thus there are never sufficient pigs on the flats to cope with the skim milk in the spring. A large trade in stores from the hill farms has resulted. On certain farms, where it is undesirable to have the sows farrow in May and June, the first litters, born about August-September, are disposed of as baconers, while the second litters farrowed in February-March are carried over the winter as thriving stores on farm-grown crops—maize or pumpkins—with meatmeal and grazing of ryegrass pastures on the better-drained paddocks. This practice avoids unnecessary losses of wintering pigs and buying in of costly spring stores.

But all success in pig keeping depends on suitable housing to meet the system followed. During recent years vast improvements have been made and new types of housing more suitable to district requirements are becoming more and more evident. The old draughty box on stilts allowing the drainage to seep through the floor boards, forming a cess pool below, so common up to a few years ago, is disappearing. On farms where the sows first farrow in May-June covered housing, of which the "Preston" is typical, are popular. Where sows do not farrow until later and stores are wintered on maize the "Dargaville" fattening and store pens, together with movable farrowing houses in small fields, are favoured.

LAND AREAS, CROPS, PASTURES AND LIVESTOCK, HOBSON AND OTAMATEA COUNTIES, 1941-42.

	Hobson.	*Otamatea.*
	acres.	acres.
Area under cultivation	201,678	168,513
Area in pasture ..	194,822	162,070
Area of river flats ..	34,496	32,896
Pasture cut for hay and ensilage ..	4,025	2,687
Annual crops ..	943	594
	No.	No.
Dairy cows in milk	34,425	30,418
Other cattle ..	41,743	38,600
Sheep shorn ..	107,749	118,040
Pigs	14,003	12,149

The marketable products of the Northern Wairoa are butter, pigs, and fat cattle from the flats; wool, fat sheep and cattle, store sheep and cattle, butterfat, and pigs from the adjacent hills. New modified methods are raising the productivity of the land of timber and gum, of swamp and hill once considered useless for farming. Much has been done, more remains to be accomplished. The management of one of the more progressive farms is now studied.

THE NORTHERN WAIROA DEMONSTRATION FARM.

This farm of 125 acres, owned and operated by the Northern Wairoa Experimental and Demonstration Farm Society (Inc.), is situated approximately 1½ miles from Dargaville on the corner of the West Coast and Kaihu Roads. The work of the farm is controlled by six practical district farmers, elected annually, together with an officer of the Fields Division of the Department of Agriculture. It must be stated that those directing the policy of the farm have exactly the same material in the way of land, stock, labour, and finance that the ordinary farmer has at his disposal—no more and no less. Certainly a small Government grant is made annually to assist with the experimental programme of the farm, but this grant is swallowed up several times over in the abnormal expenditure (and loss) occasioned by such work. The basis of the high production and success of the farm is sound farming practice; the result of the pooling of the knowledge of successful local farmers, of scientific agricultural workers, and individuals trained in farm finance.

The property when taken over consisted of 28 acres of sandy gumland hills in weak browntop and danthonia pasture, reverting to manuka, and 99 acres of river flat, typical of the northern district, made up of some 60 acres, poorly drained, in poor browntop and paspalum pasture, and the remainder undeveloped swamp land. During the first season 35 cows were milked for a butterfat production of 58lb. per acre. Improvements of all types followed until the slump period, when, like all other district farms, a difficult time was experienced. Since 1934, when a marked improvement in butterfat production commenced, with better prices and careful planning great progress has been recorded. Seventy milking cows will be milked next season and the butterfat production per acre has already been over 140lb. All herd replacements are reared on the farm, while all stock are wintered on hay and ensilage on the hill portion. To-day 72 acres of the flat are in high-producing paspalum - ryegrass - white clover pastures, 3 acres devoted to pig paddocks, 1.5 acres to a pampas grass plantation, 2 acres on which maize for pig feeding and seed were grown last year, seven acres cropped with pumpkins under contract, and 7 acres drained but undeveloped swamp pasture. The sandy gumland hill pastures are showing continual improvement through the feeding out of hay during the winter to the stock.

Drainage, Layout, Shelter

The previous occupiers had put in an unsatisfactory drainage system, which was haphazard in layout and with no definite outlet. The flats are low-lying and the water level in the drains is badly affected by the tidal action of the river. The construction of a deep and adequate main outlet drain was carried out. A 2ft. flood-gate was provided, and subsidiary drains dug along fence lines. This provided for the area to the west of the Kaihu Road. During successive years several fields were mole drained with quite good results. This work enabled pastures to be improved and established with a considerable rise in production. Later it was realised that the system was still far from adequate, so during the past eight years the layout has been remodelled and improved. The flood-gate was unable to be sited near the edge of the Kaihu River and was placed on the lower side of the road culvert, some 18 chains back from the river. This long drain, 10ft. deep in places and open to tidal waters twice a day, was difficult and costly to maintain. The drain silted up rapidly, rendering the working of the gate ineffective. In the

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early winter of 1939 an electric flood pump was installed. Maintenance costs of the long drain were cut drastically and drainage was obtained for twenty-four hours of the day when necessary as against the limited time between tides when the flood gate operated. Following this all farm drains were deepened, and new drains constructed to cut off more effectively the hill water from the flats. The average annual costs of running the pump for the first three years worked out as follows:—Interest, £7; depreciation, £5/12/-; power charges, £5/19/10—a total of £18/11/10 per annum.

Improvements in farm production quickly resulted. The land was drier in the early spring, ryegrass gave infinitely earlier and better growth, cows could be calved earlier, and higher production was ensured. The production figures for the three months, July to September inclusive, reveal the economic value of the pump. The butterfat production is as follows, July to September (inclusive):—

1938	2330lb.	butterfat
1939	2392lb.	„
1940	2941lb.	„
1941	3522lb.	„

During the period the herd had not been increased in numbers, but it was possible to provide them with more and better feed during the spring months. Calving now takes place from mid-July to the end of August, and not as previously, mid-August to the end of September.

Following the above work drainage improvements were made to the area east of the Kaihu Road. This involved the drainage, stop-banking, and install- the drainage, stop-banking, and installation of flood gates for 21½ acres. Of this area 12 acres were underdrained with manuka fascines. In order to obtain thorough drainage of the farm flats consideration is to be given to tile draining, which has been placed in the list of post-war improvements.

As is the case on all farms taken over after some initial development work has been done, any improvements to farm layout have been difficult. The original fence lines, drains, and buildings, considered along with improvements in pasture and stock management over the past decade, do not make the position any easier. The farm layout is not ideal for modern farm practices, and the cost of a radical change is prohibitive. However, the existing sub-division does enable a system of controlled rotational grazing to be followed. The standard subdivision fence consists of three 3in. barbed wires; 45in., 30in. and 15in. from the ground respectively, tightly strained on three posts to the chain together with battens between posts. An electric fence outfit proves extremely valuable for temporary fencing of crops and especially for closer sub-division for better utilisation of the pastures.

Shelter, both tall and low, has been provided. On the sandy gum hill a breakwind of *Pinus pinaster*, *Pinus insignis*, and *Eucalyptus Macarthurii* has been planted. Protecting the house is a fine belt of *Pinus insignis*. On the flats *Pinus insignis*, macrocarpa, and *Cupressus Macarthurii* provide tall shelter, while pampas (which proves ideal), flax, and *Acacia verticulata* do well.

Pasture Establishment

During the existence of the Farm Society a constant improvement in pastures has taken place. The former low-producing pastures have been converted in some paddocks by ploughing and resowing, and in others by topdressing with lime and basic slag or superphosphate, from poor browntop and paspalum swards deficient in clovers into ryegrass-paspalum—white clover swards. The combined results of improved drainage and increased ryegrass and white clover have brought the butterfat production peak earlier. Previously the peak was reached in December, just as is common still over the Northern Wairoa flats. During recent years the butterfat production attains its maximum in October, and this is maintained at the same level through to December and even to early January.

It has often been stated that, once broken up by the plough, the Northern Wairoa flats take several years after sowing before a satisfactory covering of grass and clover can be established. Experience on the Demonstration Farm proves this statement to be incorrect. When the land is treated with thorough cultivation, dressed with adequate quantities of lime and phosphate and sown early with certified strains of grasses and clovers, excellent results have eventuated. The best results have been obtained by ploughing during the late spring, working down, summer fallowing during which regular harrowings and discings were given, applying lime at the rate of one ton per acre in late January, and sowing the seed during the last week of February together with 3cwt. of superphosphate per acre. The seed-bed was rolled with the Cambridge roller both before and after sowing the seed. Where it has been necessary to grow turnips for feeding the milking herd during the summer a modification of the foregoing has given good results. Spring ploughing takes place earlier, and care is taken to feed all the turnips early so that the grass seeding takes place by the end of March. Half the lime is sown with the turnip crop, the remainder immediately the land is free of the crop. The land is not ploughed again, but thoroughly disced and harrowed to no more than 2in. deep. Rolling and seeding then follow as before. The absence of the ploughing within a few weeks of sowing ensures that the natural consolidation is not lost. This practice of cropping may result in the spring ploughing being performed while the soil is still too wet and does not crumble up freely, and also means a later sowing than is desired. Experience in preparing a so-called seed-bed by means of discing and rotary hoeing of old pasture or unimproved land, although producing some results, proved far inferior to the use of the plough.

The standard farm seed mixture is:

	Per acre.
Certified perennial ryegrass	25lb.
Paspalum	5lb.
Certified cocksfoot	5lb.
Certified white clover ..	3lb.
Broad red clover	2lb.
Timothy	2lb.
Lotus major	½lb.

If sufficient paspalum is present or likely to come away from previous seeding, the paspalum is omitted, and the cocksfoot is increased. In normal times the new pasture received a further 3cwt. of superphosphate per acre the following August or September. By such practices high-producing pastures are established in the shortest time possible.

Pasture Maintenance

The high productivity of the improved pastures of the flats is maintained by careful management. Fields are rotationally grazed throughout the

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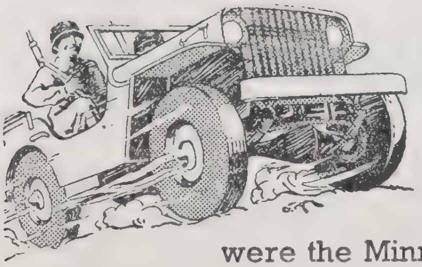

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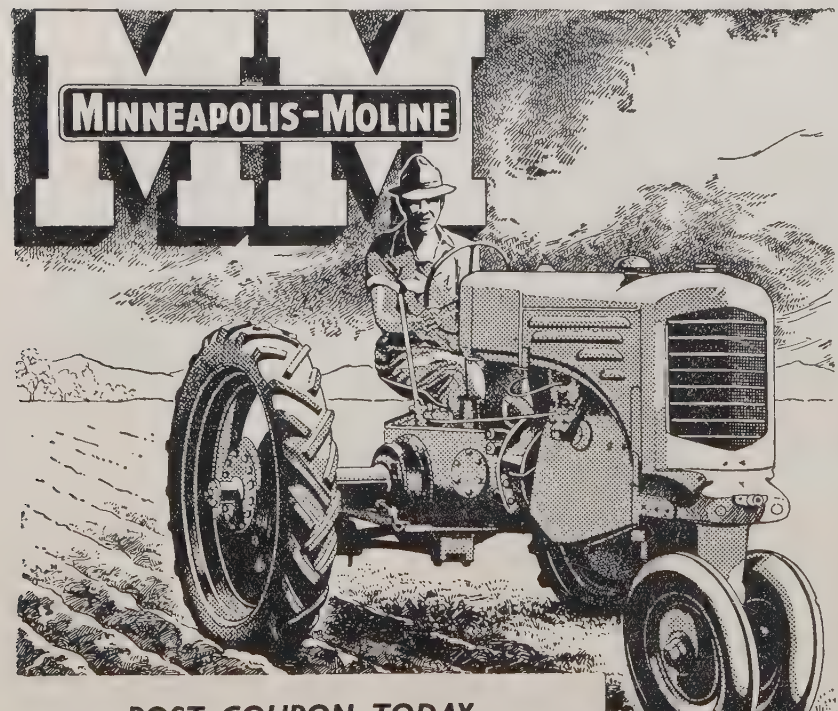

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season. During the summer months the mower is kept busy topping off the rough uneaten patches and paspalum seed-heads. Harrowing to spread the droppings takes place before the pastures are spelled for the winter and again if necessary later on in the spring. After comprehensive trials carried out over many years the following top-dressing programme was adopted until fertiliser supplies were recently restricted. At first the lime content of all fields on the flats was raised by liming at one ton per acre. Annual dressings of 5cwt. of lime were made, followed along with 3cwt. of superphosphate per acre, except where 3cwt. of basic slag was applied. The fields closed in May to provide an early bite for the newly-calved cows and also those with a suitable ryegrass content received super; while those areas with a paspalum-white clover sward, from where most of the summer butterfat production is obtained, received the basic slag. Topdressing is completed each year by the end of March, the lime being applied from February and the phosphate following. Early topdressing proves very beneficial in increasing the bulk of early feed, i.e., the ryegrass. Autumn growth of white clover is stimulated, and this in turn supplies the necessary nitrogen for the ryegrass to make good growth in the late autumn, winter, and early spring. Recent wartime innovations in the farm topdressing practice are the use of liquid farmyard manure, a profitable practice, and the use of serpentine super.

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Hay and Ensilage

While such matters as improved drainage, good pastures, topdressing, and good stock enabled the farm to build up a high standard of production, it is the ample provision of feed that enables the farm to hold an honoured position as far as production is concerned in the district to-day. Details of the position over recent years are:—

Season.	*Hay.*		*Ensilage.*		*Turnips.*	
	Acres.	Tons.	Acres.	Tons.	Acres.	Tons.
1940-41	25½	40	14	84	2½	72
1941-42	18	43	12½	80	3½	60
1942-43	31	59	—	—	3	69
1943-44	22½	69	—	—	—	—

During the past two seasons the extra labour for ensilage making has been unobtainable. The turnip crop follows the maize crop when necessary. These figures reveal that the feed provision ranges from 12cwt. to 16cwt. per head of stock wintered, a figure well above the district average of approximately 3cwt.

Cropping

As the district soil and climate conditions are suited for all-grass farming, cropping is confined to the growing of turnips some seasons for summer feeding of the milking cows, and to the growing of maize every year for winter feeding of pigs. One to two acres of Johannsen's white maize—a high-yielding variety proved by extensive trials—are sown. The average yield is 90 bushels per acre, while one season a yield of 108 bushels per acre was obtained.

The Dairy Herd

The dairy herd of grade Jerseys, with a dash of Shorthorn in some animals, averages 60 to 65 cows. Butterfat production ranges from 16,000 to 17,000lb. per annum. Cow production has gradually been raised from a figure of less than 200lb. butterfat per annum to a herd of average of 307lb. in 277 days obtained in 1943-44. Herd testing has been continuous and full records of breeding and production are kept on usefully-designed cards procured from the Dairy Board. From the records thus kept much useful information is passed on to the Dairy Board in their sterility surveys, etc. Purchases of butterfat-backed pedigree Jersey bulls, usually as yearlings, are made from time to time. An important point is that the new bulls of the same family strains are procured. All herd replacements are now reared on the farm. At one time difficulty in rearing was experienced. Deaths at the yearling age were frequent and these were put down to stomach parasites. However, since a change was made in feeding, particularly up to 12 months of age, no further deaths have occurred. This definitely indicates that much of the trouble experienced is due to poor feeding and not to stomach worm infestations.

Twelve to 16 calves are reared each year. All calves are individually fed and receive full milk to three weeks of age. A change to skim milk supplemented at first by linseed meal and later by crushed oats follows. The skim milk is cut out about the end of November, and each calf receives 1lb. per day of crushed oats for the next six weeks. As early as possible the calves are rotated round the paddocks ahead of the cows to graze the best of the pasture. Later they are grazed on the kikuyu areas of the hill. In early May the best of the hay is put out to enable the calves to become accustomed to feeding before the winter sets in properly. From mid-June until the weather improves in August each yearling receives 1lb. of crushed oats per day in addition. The farm thus rears well-developed heifers and obtains efficient butterfat producers for replacements.

Conditions on the farm enable the cows to be mated to calve at an earlier period than is common in the district; 5 per cent. have been carried over or calved by July 1; 41 per cent. calve in July; 34 per cent. in August; 14 per cent. in September, and the remaining 6 per cent. later. As the cows dry off in the autumn they complete the grazing of the flats until early May. They are then grazed on the hill pastures, where they receive hay and ensilage. Immediately prior to calving they are brought down, individually as necessary, to the "springer" paddock, changed each year, and one of the drier and better-sheltered fields on the flats. The milking herd then is rotated round, grazing the winter-produced ryegrass growth. Hay and ensilage feeding continues till the weather improves, usually in late August. Pasture growth is ample until late summer and autumn, when ensilage and in some seasons turnips are fed.

Pigs

The management of pigs, which provide an ever-increasing proportion of the farm income, has progressed along lines peculiar to district conditions. On this farm has been developed the "Dargaville" type of fattening pens, combined with an open-air system of movable farrowing pens in small fields of at least one-third of an acre in size. Pig pens, or rather paddocks of this size, even on the heavy clay flats have held, for over eight years, a good sole of pasture, mainly of ryegrass. The pens, besides being used for their primary purpose of feeding pigs to baconer weight, are valuable to house winter stores.

A pedigree Tamworth boar is used with either pure English Berkshire or Tamworth-Berkshire cross sows. The pigs from such matings give good type baconers which do excellently under the conditions pertaining on the farm. The first litters born August-September are disposed of as baconers, while the second litters farrowed February-March are carried over the winter as light stores and sold as baconers in October. This breeding programme is possible owing to the maize crop. It avoids having litters of sucking pigs on the farm over the severe winter period mid-June to July, brings the feed demand in line with the skim milk supply, and enables all pigs to be turned off at baconer weight. Of course, breeding does not always work out "according to Hoyle," and sometimes pigs of heavy store weight are on hand when the skim milk supply goes off. If the pigs are approaching baconer weight, maize is used with meatmeal to finish them off; if of medium store size, maize again carries them along in a thriving condition to the spring supply of skim milk. The introduction of winter feeding of maize has considerably improved the financial returns, as shown in the following table:—

Average of three years:—	*Before growing the maize crop.*	*After growing the maize crop.*
Pig flesh per 100lb. of butterfat	under 40lb.	60-70lb.
Return per lb. of butterfat	1.38d.	2.46d.
Net return per cow	£1 9s. 7d.	£2 13s. 9d.

The net income from the pigs was increased by an average of £73/11/6 per annum for the three years after introducing the maize crop, as compared with that received during the three prior years.

The farm management practices featured above are those of the ordinary work of the farm as a commercial dairy farm. Experimental and trial work has not been inconsiderable. The income from the ordinary farming operations has had to meet the costs of the running and maintenance of the farm, as well as, with the Government subsidy, provide funds for experimental work. The practices described can well be put into operation with suitable minor adaptations on many district farms. The farm committee, an energetic body of local farmers, have, by their careful planning, considerably raised the standard of management and production of the farm.

Thanks are expressed to the Director, Soil Survey Division, Scientific and Industrial Research Department, for data in the soil map, and to the Lands and Survey Department for drawings of maps.

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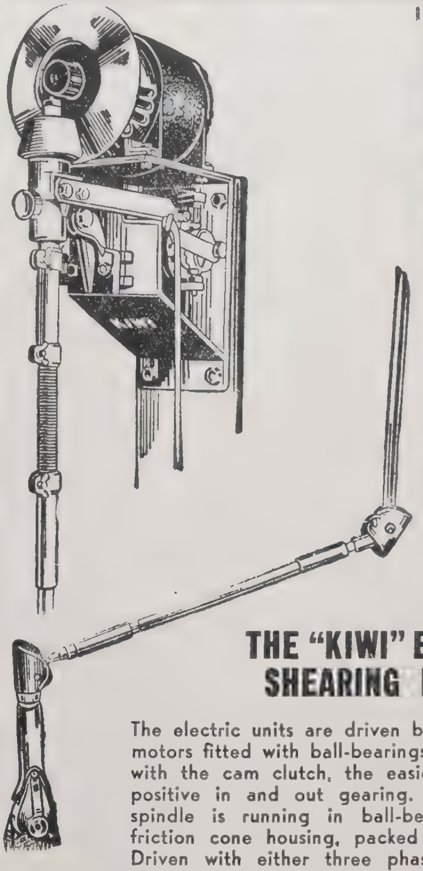

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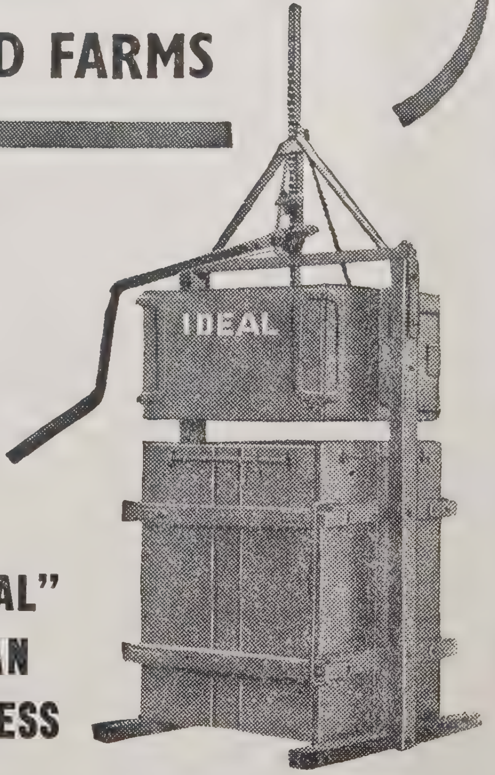

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BEEKEEPING

By

T. S. WINTER,
Senior Apiary Instructor,
Wellington

How and When to Establish a Domestic Apiary

BEEKEEPING with a few hives can be made a profitable occupation and an interesting hobby by the amateur in most localities throughout New Zealand, if conducted on proper lines with painstaking energy.

NEW ZEALAND, situated as it is between latitudes 34deg. south and 48deg. south, has a comparatively mild and open winter in most parts, and the country abounds with clover and other honey-producing plants, shrubs, and trees, the majority of which provide nectar in varying quantities throughout the beekeeping season—some being valuable for spring bee-feeding purposes, while others provide the main nectar flow from which the bees are able to gather and store a surplus of honey over and above their own requirements if they are kept under proper conditions. It is this surplus which is made available for table and marketing purposes.

Who May Keep Bees

Any person may become a beekeeper, but only those who are sufficiently interested and will apply energetic thought, skilful planning, and, above all, promptitude and persistence, can hope to succeed as beekeepers.

All beginners suffer more or less from the effects of bee stings, but in most cases the bad effects wear off gradually as the system becomes inoculated against the poison, until finally very little inconvenience is felt from stings. In rare instances, however, there are to be found people who suffer severely from bee stings and whose system does not become immune to the poison. There are also some individuals who are too nervous to go amongst their bees with any degree of confidence. Such people should not keep bees. No person who keeps bees can escape being stung occasionally, and the sting of the honey bee generally hurts even the seasoned beekeeper for an instant.

Honey bees are dependent upon favourable floral and climatic conditions, and also upon the attention and care they receive at critical times during the year. The beginner must, therefore, study closely bee behaviour and methods of colony management suitable to his location.

Colonies of bees should not be established by inexperienced beekeepers in closely-settled residential areas, where they may become a nuisance to neighbours, or in a locality where there is insufficient bee pasture. Bad handling of bees by one who is a beginner, especially at times when they should be left alone, may cause on orgy of stinging, and failure to give attention promptly when required may result in a loss of numerous swarms which get clear away and establish themselves in undesirable places, where they are likely to become a menace to all competent beekeepers in the neighbourhood.

Before securing bees the beginner should spend as much time as possible with a successful neighbouring beekeeper during the summer months when the bees are being attended to, and should supplement this experience by reading beekeeping literature. Suitable books are procurable for this purpose, and the "Journal of Agriculture," which is published monthly, contains seasonal notes on beekeeping. The dominating desire of every beginner should be to master the art of colony management, the fundamental considerations of which are the care and maintenance of good breeding and working stock, an adequate supply of supers and combs for all purposes, including the storage of any surplus honey, and timely brood and hive manipulations to ensure a maximum number of worker bees at the beginning of the main honey flow. When this has been achieved in some measure and is put carefully into practice, surplus crops of honey may be expected. It is a sheer waste of time to proceed with beekeeping in any other way.

How to Establish Bees

There are several ways to start up in beekeeping:—

1. Full-size standard hives (complete with bees, bee-combs, and stores) may be purchased from a neighbouring beekeeper.
2. A three- or four-frame nucleus colony complete with stores, brood, and bees (including a young queen) may be purchased from any reliable

DELAYS *are* DANGEROUS
EFFECT That POLICY
with the
GOVERNMENT LIFE
TO-DAY

breeder, and transferred on arrival into a standard hive prepared to receive it.

3. Swarms may be caught during the summer and placed in a standard hive made ready for the purpose, subject to conditions which will be mentioned later.

In all cases where bees and used hive equipment are purchased the buyer should ascertain whether the vendor has a permit from the Government apiary instructor for the district to sell for removal. Such permits are necessary under the Apiaries Act, 1927, to prevent the indiscriminate distribution of diseased bees and appliances, and thereby the possible spread of bee diseases.

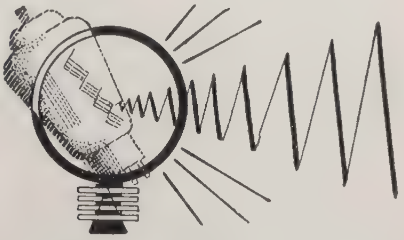
The buyer should also examine the hives to determine the condition of the equipment, the amount of honey and pollen in the combs, and the strength of each colony, or engage a competent beekeeper to do so for him, otherwise poor or worthless stocks may be purchased. The fact that bees may be flying freely from the hive entrance is not a sufficient basis in itself for judging the condition of the colony. A thorough examination of the interior of each hive is necessary.

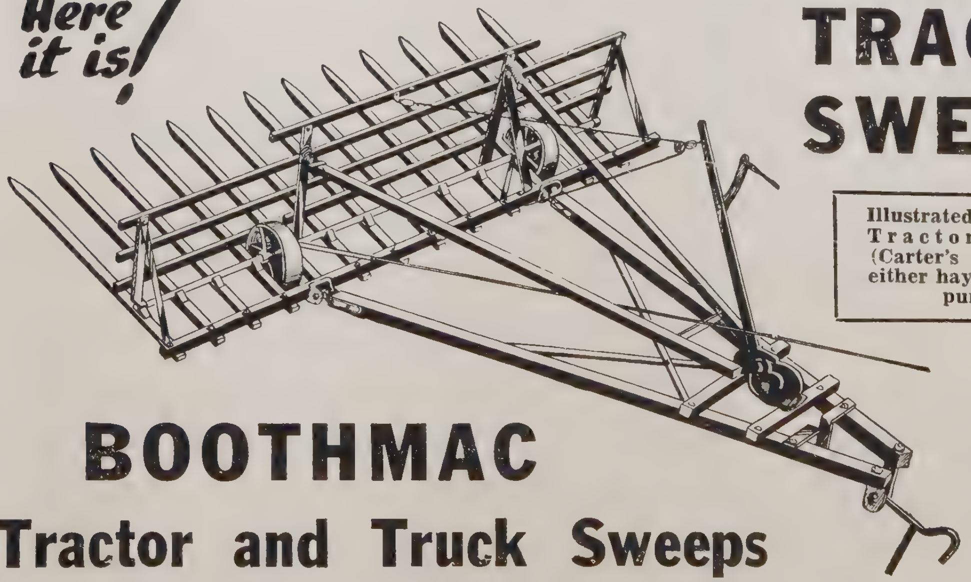
There is an advantage in buying good stocks and hives complete early in the season, provided they have plenty of stores to carry them on to the honey flow, in that they are already established and are well away to a good start with the new season's work immediately the hives are placed on their new location. This also saves the beekeeper much time in making up new appliances, but it is not always possible readily to find beekeepers who are willing to sell hives, bees, and equipment in this manner.

Nucleus Colonies

The purchase of a good strain of disease-free Italian bees in the form of nucleus colonies from any reliable breeder is recommended as the safest plan for the beginner. These are usually made ready for transport by taking three or four combs containing brood and stores with adhering bees from a strong colony and placing them in a small hive box made for the purpose.

The original queen of the main colony may be taken with the bees or a young queen may be introduced by the usual cage method. To ensure the safe carriage of the queen during a long journey she should be placed in an ordinary introducing cage, which is then





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held in place between the combs accompanying the bees. This is done by first running in the queen, followed by 15 to 20 escort worker bees, as illustrated in Fig. 3. The top of the nucleus box is then covered by a screen of wire gauze for ventilation, and all is ready for transport.

Before ordering a nucleus colony of bees all the necessary hive equipment should be purchased and made ready to accommodate them. To handle bees it will be necessary first to procure a smoker and bee veil.

Hive Equipment Required

All new hive equipment is sold by agents of manufacturing firms in the main centres throughout New Zealand, packed in the flat to save packing space and freight charges, and requires to be assembled by the beekepeer ready for use.

Fig. 1 illustrates the set-up of a standard two-storey extracted honey hive, consisting of the following equipment:—

1 floor-board.
2 standard hive bodies (brood chamber and super).
1 queen excluder.
20 Hoffman self-spacing frames.
20 sheets of medium brood comb foundation.
1 ¼lb spool tinned wire.
1 flax fibre mat (or clean sacking cut to size).
1 hive roof.
1 division board feeder.
Sufficient tacks, nails, and paint.

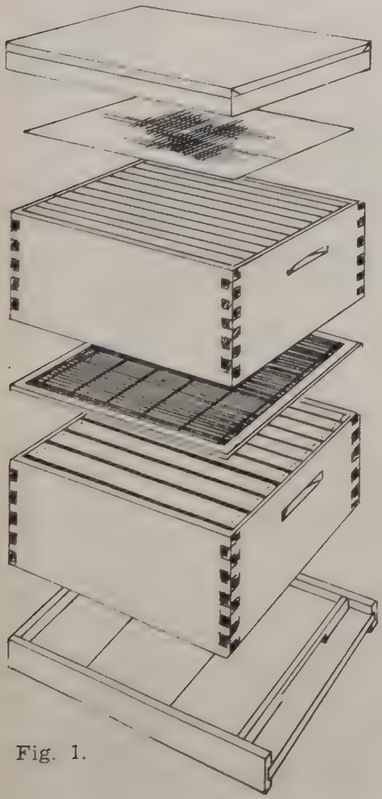

Fig. 1.

The approximate present-day (1944) cost to purchase the above materials (including a nucleus colony) to establish a hive of bees is £3 17s 2d, to which must be added any freight and cartage charges incurred. More detailed particulars may be obtained from a bee appliance price list.

A hive of bees established in this way early in the season would require at least one extra super complete with frames and comb foundations to accommodate any surplus honey crop that season, at a cost of approximately 11s.

Fig. 2 is the set-up of a section honey hive, the present-day cost of which is approximately £3 12s 11d, including a nucleus colony of bees, and consists of the following materials:—

1 floor-board.
1 full-depth hive box (brood chamber).
1 queen excluder.
2 half-depth standard hive boxes.
14 half-depth section frames.
14 section separators.
56 4¼in x 4¼in sections.
½lb thin super comb foundation.
1 hive mat.
1 roof (hive lid).
Sufficient tacks, nails, and paint.

Where an extra brood chamber or a half-depth section comb honey super is required when the bees are thoroughly established these would cost approximately 11s each complete.

When section comb honey is being produced it is advisable to use a queen excluder on each hive to keep the queen away from the sections.

Doing Own Carpentry

Where the beginner has a knowledge of carpentry and wishes to increase the number of hives kept he may be able to make his own hive boxes, lids, and floor-boards, but great care must be taken to cut these to standard dimensions with correct bee spacing.

Site of Hives

While hives may with advantage be placed in close proximity to fruit trees for pollinating purposes, they should not be placed directly under the trees, nor on or facing lawns or the kitchen garden. The clothes-drying area should also be avoided. An airy location, sheltered from the prevailing winds, facing approximately north, where the normal flight of the bees to and from the hives is not obstructed, would be suitable. A well-situated domestic apiary complete with suitable honey house, which is also used as a storeroom during the off season, is illustrated in the heading to this article.

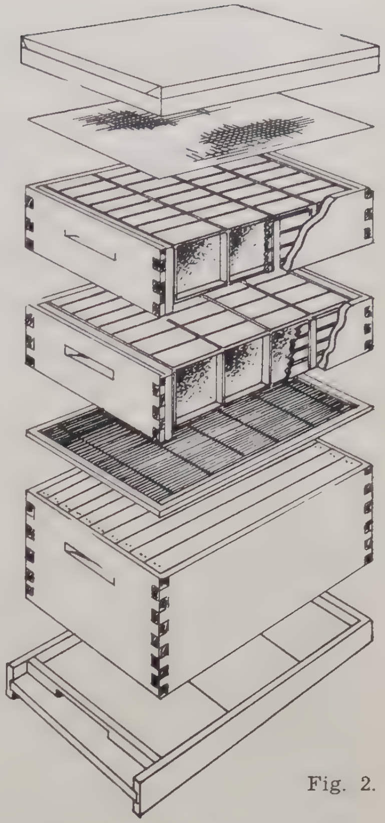

Fig. 2.

Transferring Nucleus

On arrival of the bees the box should be placed in a cool, airy, shaded, dark place for an hour or so to enable the bees to settle down quietly before handling. Meantime, the prepared hive should be placed in position on its permanent stand complete with frames fitted with wax foundation and a feeder. Carry the box to the permanent stand (Fig. 4). Use a gentle puff of smoke (from a bee smoker) over the top of the nucleus to quieten the bees. Remove the wire gauze screen and also the cage containing the queen. Take a firm grip of all three frames with the forefinger of each hand between the two outer combs to ensure a good hold on all the combs as illustrated (Fig. 5),

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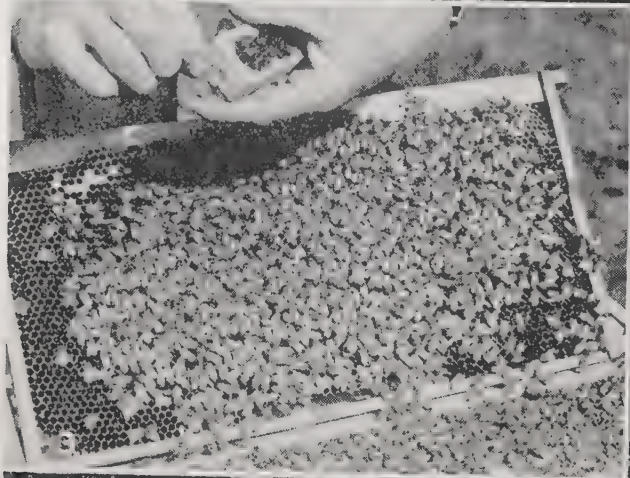
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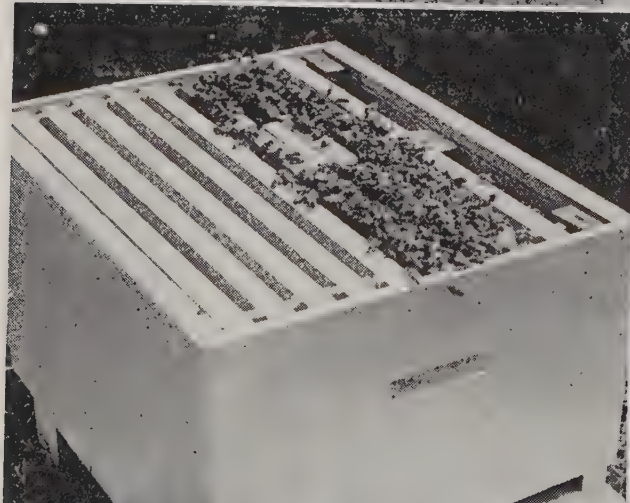
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and transfer the whole into the new hive (Fig. 6). Next place the cage containing the queen between the combs and directly over or next to the brood (Fig. 7), where she should be quickly released by the bees. Any bees remaining in the nucleus box may be shaken gently down on to the alighting board at the hive entrance or on top of the frames in the hive.

Should the queen accompanying the bees have her freedom in the nucleus box, care should be taken not to crush or otherwise lose her during the transfer. Finally, fill the feeder with lukewarm sugar syrup made to a strength of two parts sugar to one of water (the sugar should be thoroughly dissolved), place the mat in position, and close down the hive (Fig 8).

When the bees are all inside the hive place a block of wood across the front to reduce the size of the entrance to about two inches. Keep this block in place until the bees have built up and occupied all the combs in the brood chamber. The entrance may then be gradually widened to full size according to the strength of the colony and seasonal conditions.

Feeding should be continued with sugar and water solution as previously prescribed, at regular intervals of about six days if the weather is bad, but may be discontinued immediately the bees are able to gather nectar in sufficient quantity from natural sources.

It is not good practice to feed more syrup than the bees are able to take up and store overnight. Any carry-over in the feeder may cause undesirable activity and attract the attention of robber bees, with fatal results to the nucleus colony.

Feed in the evening and take care not to spill any syrup about the hive. When the bees are nicely established and there is a continual nectar flow, the feeder should be removed and replaced with a frame of comb foundation.

As the bees make progress and the season advances extra supers should be added as required.

Transport of Bees

Although bees may be moved at any time in cases of emergency, the spring is the best time for this work. Bees may then be moved long distances with reasonable safety and minimum loss, provided they are expertly packed. It is now generally agreed that it is not desirable to move hives during the winter rest period or at times far removed from an early honey flow. Shifting bees in midsummer is not desirable because of the strength of the colonies, the large amount of brood in the hives, high temperatures, and the fact that they should be hard at work on the main nectar flow at this time of the year.

When to Order Bees

Where colonies established in standard hives are required these may be ordered for delivery during September or October, according to location north and south in New Zealand.

Nucleus colonies with young laying queens should not be purchased by the beginner before warmer weather in the late spring, or when there is a good nectar flow during October or November, according to location; otherwise the bees will have difficulty in comb building and may need a good deal of artificial feeding.

Swarms

Swarms of good size will do excellent work if hived early in the season at the beginning of the main honey flow; but only those swarms which are known to have issued from disease-free hives should be accepted by the beginner and immediately placed in a new hive.

Where a stray swarm is caught it should be allowed to remain in an empty box for at least three days before being placed on frames of comb foundation as a precaution against carrying foul-brood infection to the new hive. Any comb built by the bees during that period should be carefully burnt. The transfer of the bees from box to prepared hive should be carried out late in the day, so that the bees will not be inclined to swarm away following this drastic treatment.

Young Queens Required

The beginner and all beekeepers with only a few hives are not usually in a position to raise young queens when required.

All colonies should be re-queened at least every second season if the best results are to be obtained. Young queens of good Italian strain are best, and may be ordered from any reliable breeder for delivery during September, October, or November. Where the queen is failing the earlier the colony is re-queened the better.

The Apiary Instructor for the district may be consulted in regard to any further information and equipment necessary to operate a domestic apiary according to the number of hives it is intended to keep. Beginners should not try their hand at beekeeping with more than two or three hives to start.

Apiary Registration

Immediately an apiary of one hive or more is established, application for registration should be made on the appropriate form (obtainable from the Apiary Instructor, Department of Agriculture, in the district in which the apiary is located). There is no apiary registration fee. Failure to register an apiary renders the owner or the occupier of the land on which the bees are established liable on conviction to a penalty not exceeding £20.

DELIVERY OF FERTILISER

FROM time to time farmers experience difficulty in obtaining fertiliser at the time required for application to grassland or crops. In view of the existing difficulties in the supply of raw materials and transport, farmers are advised to ensure that their orders are placed early to avoid any last-minute rush. The attention of all farmers is also drawn to the fact that their topdressing allocations apply only in respect of the twelve-month period ending December, 1945, and that unless these allocations are taken up no carry-over into the following season can be allowed.

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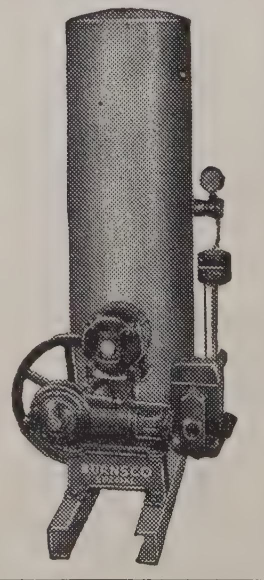

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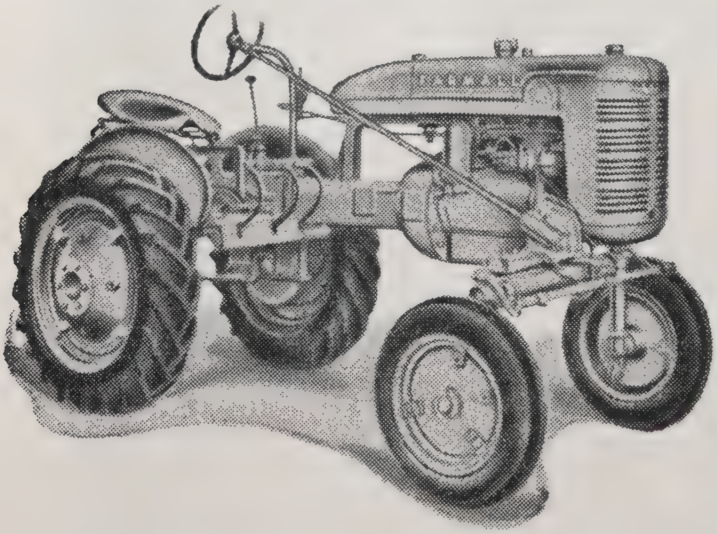

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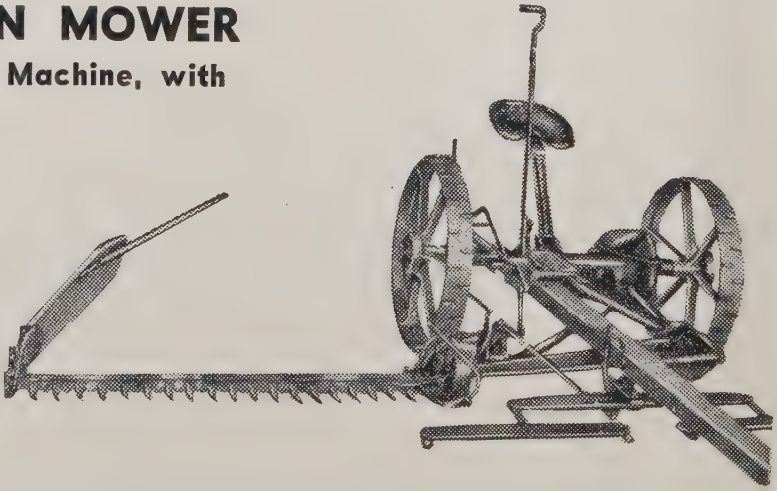

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Weed Seeds In Agricultural Seed

By

E. O. C. HYDE,

Seed Analyst, Seed-Testing Station, Palmerston North.

ANYONE who has watched a modern seed-cleaning machine in operation must have been impressed by its efficiency. These machines each season remove many tons of impurities from crop and pasture seed. They are a powerful aid to the farmer in his contest with weeds.

EFFICIENT as the seed-cleaning machine is, it is not perfect. Almost every crop of seed includes some weed seeds, which resemble the useful kind so closely in size, shape, and weight that they defy the ingenuity of the engineer and remain as impurities in the machine-dressed product.

When machine-dressed samples are examined it is found that with each kind of seed certain weed seeds are commonly associated. In cereals, for example, we find darnel, cornbind, milk thistle, wild oat, and corn gromwell. In red clover seed docks, ribgrass, field madder, English trefoil, and spearthistle are commonly observed. In ryegrass the weed seeds most frequently encountered are goosegrass, hairgrass, buttercup, and Australian flax. In white clover scarlet pimpernel, fathen, pigweed, and dodder are characteristic impurities.

Weed seeds are for several reasons most objectionable impurities in agricultural seed. They are often the means by which troublesome weeds are introduced into a crop. Seed is usually sown on a carefully-prepared seed-bed, and consequently any weed seeds included in the sowing have every chance of establishing plants. The weeds introduced in this way are generally species which compete strongly with the associated crop, and if a seed harvest follows, they contaminate the produce with weed seed impurities which are difficult to remove.

Heavy Infestation Possible

Even though weed seeds may make up only a small part of the seed sown, they can, nevertheless, be the means of introducing a heavy infestation of weeds. It is not uncommon for perennial ryegrass seed to contain 3 per cent. of goosegrass seed. If such a line is sown at the rate of 1½ bushels to the acre, goosegrass seed is broadcast at the rate of three seeds to the square foot.

When a line of cocksfoot seed containing 30 seeds of Californian thistle per ounce (equivalent to about one-half per cent. by weight) is sown at the rate of 10lb. per acre the thistle seed is distributed at the rate of one seed to the square yard. Californian thistle not infrequently occurs in cocksfoot seed in much greater amounts than that indicated in the above example. There are, by the way, some who believe optimistically that thistle seeds will not germinate unless they have first passed through some grazing animal. The truth is that the seeds germinate all too readily without any special treatment.

Importing Countries' Restrictions

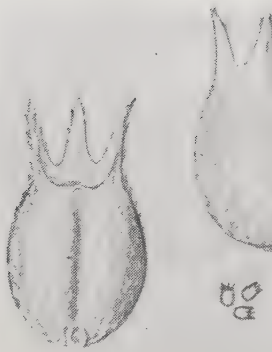
In seed for the export trade weed seed impurities are of special significance. New Zealand farmers produce many classes of seed in quantities greatly exceeding the amount required for local use, and they depend upon overseas markets for the disposal of part of the crop. Australia, Canada, and the United States provide markets for much of New Zealand's surplus seed, and each of these countries has placed legal restrictions upon the importation of seed containing an excess of weed seed impurities.

Seed containing even a trace of such weed seeds as dodder, hoary cress, or convolvulus is denied entry into any of the countries enumerated above. Australia, in addition, prohibits the importation of the seed of such common weeds as tarweed, King Island melilot, ox-eye daisy, and milk thistle, and severely limits the frequency with which many other common weed seeds may occur in imported seed. Of special interest to New Zealand seedsmen are the restrictions on spearthistle, hawkweed, wild flax, camomile, wire weed, docks, field madder, and nettles. Seed exported to the United States must not contain more than 2 per cent. of weed seeds, and it should be observed that in seed shipped to America seeds of *Paspalum*, *Danthonia*, Bermuda grass, and Yorkshire fog must be regarded as weed seeds.

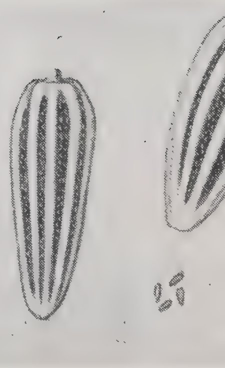
Overseas Requirements

Our increasing dependence upon overseas markets for the disposal of surplus seed makes it imperative that we study carefully the requirements of each country where our seed is in demand. It might be an advantage if those producing, dressing, and handling seed for export were more familiar with the weed seeds which exclude our produce from overseas markets.

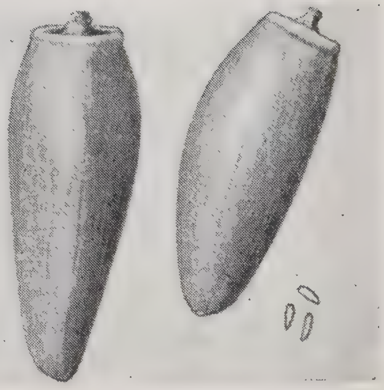
In preparing a series of notes dealing with weed seeds the writer has therefore considered first those kinds which render our produce unfit for the export trade.



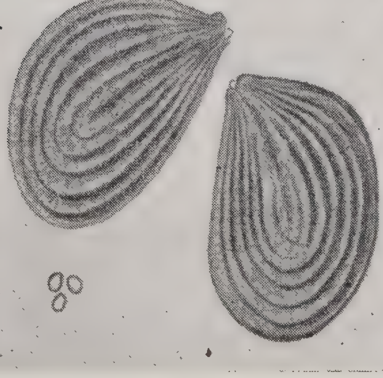
SHERARDIA ARVENSIS: FIELD MADDER. Colour grey, flecked with white. Occurs frequently in red clover, white clover, and lucerne; occasionally in cocksfoot and ryegrass. The three lobes crowning the seed are usually brushed off during machine dressing. Not more than 10 seeds to the ounce admitted into Australia. An annual weed common on cultivated land and in dry pastures.



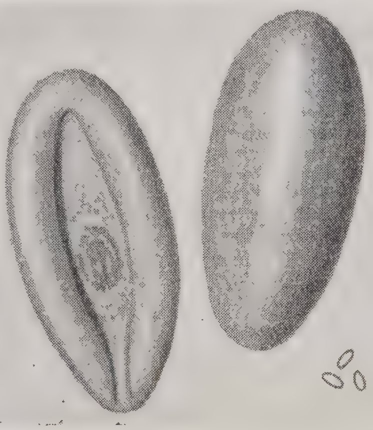
CHRYSANTHEMUM LEUCANTHEMUM: OX-EYE DAISY. Colour black with white ribs. Occurs with moderate frequency in crested dogstail, timothy, and *Lotus major*. Australia prohibits importation. In Canada classed as a secondary noxious weed seed when occurring in turf and forage grass seeds. A perennial weed common in damp pastures.



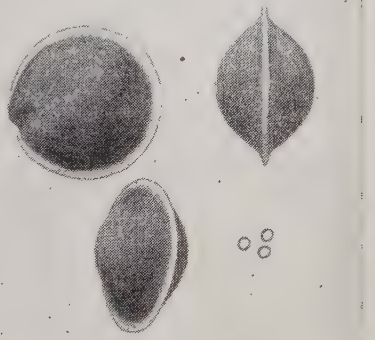
CIRSIUM ARVENSE: CALIFORNIAN THISTLE or CREEPING THISTLE. Colour brown; occurs frequently in cocksfoot and crested dogstail; occasionally in ryegrass. In Canada classed as a secondary noxious weed seed. Australia and United States prohibit importation. A troublesome perennial weed with creeping underground stems. Common in pastures and cultivated land.



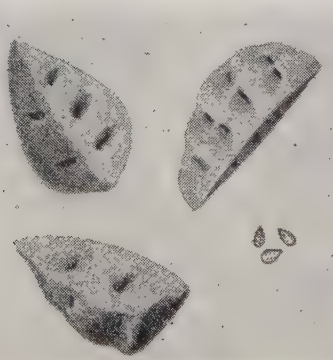
THLASPI ARVENSE: PENNYCRESS. Colour black. Occurs infrequently in ryegrass from the South Island. In Canada classed as a secondary noxious weed seed. An annual weed not troublesome in this country.



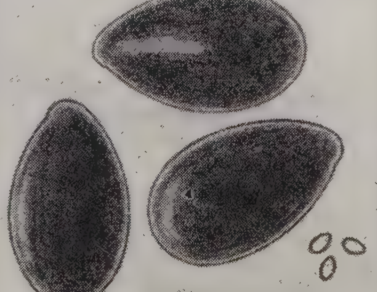
PLANTAGO LANCEOLATA: RIBGRASS. Colour brown. Occurs most frequently in red clover and lucerne. In Canada classed as a secondary noxious weed seed. Australia admits 200 seeds to the ounce. Perennial rosette weed common in pastures.



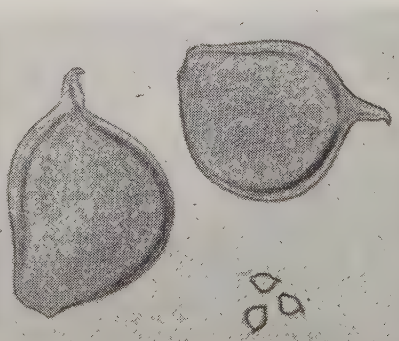
SPERGULA ARVENSIS: SPURRY or YARR. Seed black with narrow white wing. Occurs frequently in white clover. Australia admits not more than 50 seeds to the ounce. An annual weed often troublesome on cultivated land.



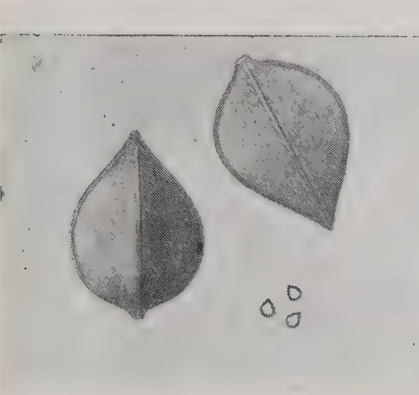
ASPHODELUS FISTULOSUS: ONION WEED or ASPHODEL. Colour grey to black. Occurs rarely in subterranean clover and ryegrass. Australia prohibits importation. A perennial weed not uncommon in coastal areas.



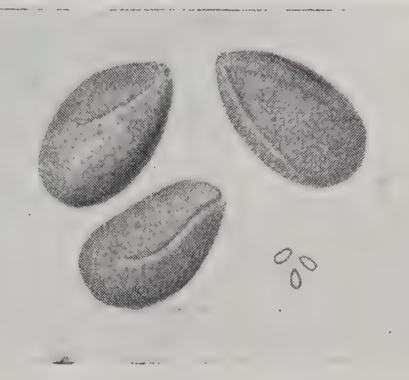
LINUM MARGINALE: AUSTRALIAN FLAX. Colour brown. A common impurity in ryegrass seed. Australia admits not more than 10 seeds to the ounce. A weed of annual or biennial habit, common in pastures.



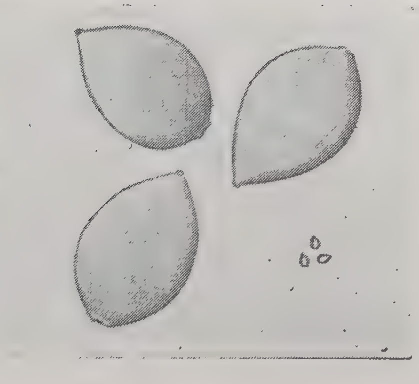
RANUNCULUS REPENS: CREEPING BUTTERCUP. Colour light brown. A common impurity in ryegrass. Not more than 20 seeds to the ounce admitted into Australia. A creeping perennial weed common in damp pastures.



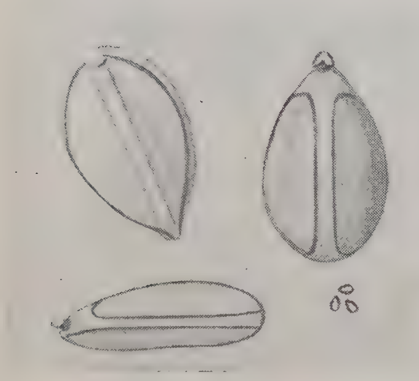
RUMEX CRISPUS: CURLED DOCK. Colour brown. Occurs frequently in red clover and lucerne. In Canada classed as a secondary noxious weed seed. Not more than 20 seeds to the ounce admitted into Australia. A perennial weed common in damp pastures.



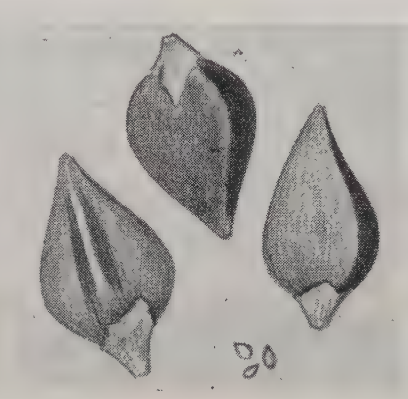
LEPIDIUM CAMPESTRE: FIELD CRESS. Colour dark brown. Occurs infrequently in ryegrass and red clover. In Canada classed as a secondary noxious weed seed. An annual or biennial weed of cultivated land and pastures. Not common.



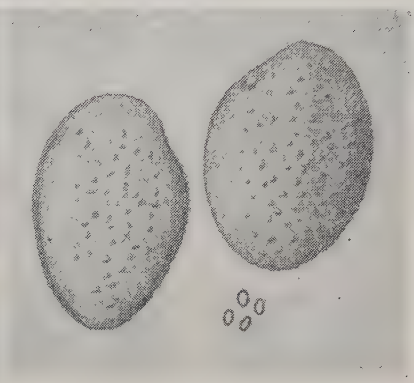
URTICA DIOICA: STINGING NETTLE. Colour yellow. Occurs with medium frequency in white clover. Not more than 10 seeds to the ounce admitted into Australia. A creeping perennial weed with stinging hairs. Not an aggressive weed in this country.



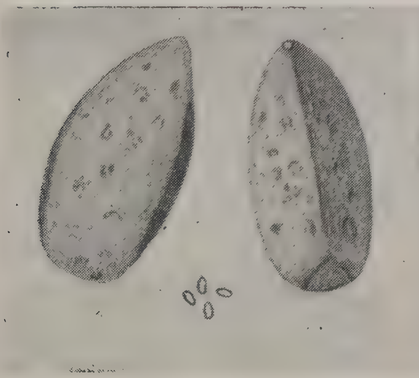
PRUNELLA VULGARIS: SELFHEAL. Colour brown. Occurs frequently in white clover and red clover. In Canada classed as a secondary noxious weed, when it occurs in turf and forage grasses. A creeping perennial weed common in damp pastures.



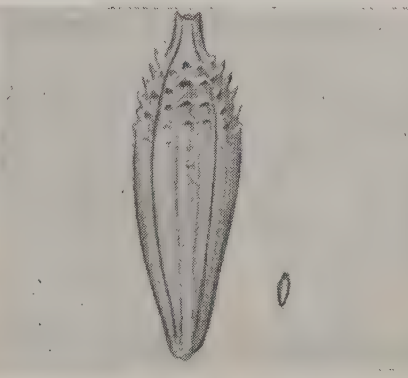
POLYGONUM AVICULARE: WIREWEED. Colour black to reddish brown. A common impurity in red clover. In Canada classed as a secondary noxious weed seed when occurring in turf and forage grasses. Australia admits not more than 30 seeds per ounce. An annual weed common on arable land and roadsides.



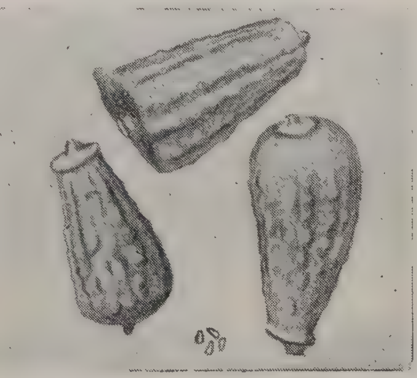
MELILOTUS INDICUS: KING ISLAND MELILOT. Colour grey to brown. Fresh seeds have a sweet scent. Commonly found in strawberry clover and occasionally in red clover and ryegrass. Totally prohibited in Australia. An annual weed abundant in many dry, sandy regions, especially near the coast.



MARRUBIUM VULGARE: HOREHOUND. Colour grey, with irregular black markings. Occurs infrequently in red clover, white clover, and ryegrass. Not more than five seeds to the ounce admitted into Australia. A shrubby perennial weed common in dry pastures.



TARAXACUM OFFICINALE: DANDELION. Colour brown. Occurs not infrequently in chewings fescue and other grass seeds. In Canada classed as a secondary noxious weed seed when in turf and forage grasses. A perennial rosette weed, common in pastures, lawns, and waste places.



ANTHEMIS COTULA. STINKING MAYWEED. Colour yellow to brown. A common impurity in white clover. Australia admits no more than 10 seeds to the ounce. An annual weed with an unpleasant smell. Common on cultivated land and in pastures.

In the following notes statements concerning the legal requirements of different markets are based on the regulations under the following Acts:—

Commonwealth of Australia — The Quarantine Act, 1908-1924.

United States of America—The Federal Seed Act, 1939.

Canada—The Seeds Act, 1937.

In preparing the accompanying illustrations seeds have been drawn at any degree of magnification convenient for the presentation of features useful in identification. An endeavour has been made to reproduce the appearance of normal specimens of each kind. Where marked variation is found several specimens have been drawn to indicate the range of variation. Only when it is necessary for the reproduction of some useful or interesting detail is any aspect of the seed illustrated other than those most commonly presented. The small outline drawings with each illustration indicate the natural size of the seed.

Weed Seed Identification

It is by no means difficult for anyone to attain a useful degree of proficiency in the identification of common weed seeds. All that is required is keen eyesight, sustained interest, and some reliable guidance. The only equipment necessary is a hand lens giving a magnification of about eight diameters. It is fortunate for our purpose that weed seeds are amazingly diverse in size, structure, shape, colour, surface texture, and markings. There are not many cases among the common weeds where the seeds of two different kinds resemble each other so closely as to be indistinguishable.

(All drawings are by the author.)

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FARMING IN NEW ZEALAND

Pasture Production

JUST as the climate and topography of New Zealand vary between fairly wide extremes, so do its pastures. Some are on low-lying swamp country, some are on well-drained, level, rich soils, while others are on the steep, unploughable hills. Every type of country has its particular type of pasture with which are associated problems of establishment and maintenance.

By

S. H. SAXBY,

Instructor in Agriculture, Wellington.

NEW ZEALAND, with its length of over a thousand miles running approximately north-east and south-west, embraces a wide range of climatic conditions, varying from the high-rainfall, humid areas of the north to the low-rainfall, almost continental climate of Central Otago, with its extremes of dry heat and dry cold.

Topography is also very variable. Much of the country is mountainous, some steep and precipitous, while much consists of coastal or inland plains and plateaux.

TYPES OF GRASSLAND.

The types of pasture that can be established in the various parts of the country are determined by three main factors, namely, climate, topography, and fertility, particularly the ability of the soil to maintain the optimum amount of moisture for plant growth.

Climate, which cannot be changed at will (except of course in the case of irrigation), limits the distribution of many of our pasture plants, both indigenous and exotic.

Topography is frequently an impassable barrier standing in the way of pasture establishment or improvement. Steep, rocky hillsides or undrainable swamps are frequently impossible to improve to any appreciable extent.

The ability of the soil to retain the optimum amount of moisure for plant growth is extremely important—sufficiently so to be a main deciding factor regarding the type of pasture that may ultimately be obtained. Where the moisture content can be maintained at a level favourable to the continued maintenance of white clover good fattening and milk-producing white clover base pastures can also be maintained. Where the moisture content of the soil is either higher or lower poorer pastures result.

The soil itself is also an important factor, important chiefly for its presence or absence rather than on account of its quality or natural fertility. The fertility of most soils, certainly not all, can be raised to a sufficiently high standard to enable good pastures to be maintained. This standard can be measured by the ability of the soil to grow a good cover of white clover. Where white clover can be grown it is also possible to maintain a good pasture. That such pastures can be maintained on what has previously been regarded as relatively poor land is exemplified on many soils, including the gumlands of the north, the pumice of the Central Plateau, and the cold clay soils of the south.

The types of pasture in New Zealand can therefore be classified into the following groups, which are determined not so much by the soil, but by the climate and topography and the manner in which they fit into farming practice.

1. **Permanent, high-producing, fattening pastures.**
2. **Unploughable permanent hill-country pastures derived from scrub and bush land.**
3. **Tussock and other native grasses.**
4. **Permanent, low-producing pastures on land that has at some time been ploughed.**
5. **Short-rotation pastures.**
6. **Temporary pastures.**
7. **Peat swamp pastures.**
8. **Swamp pastures.**
9. **Pastures sown mainly for seed production.**

Frequently there is no strict differentiation between the foregoing groups, and several may merge into one another. Nevertheless, they do form a basis for the discussion of our 32 million acres of grassland.

1. Permanent, High-producing, Fattening Pastures.

These are scattered throughout the country, usually situated on ploughable land that is well drained and that has an adequate supply of moisture. The fertility of these areas, whether natural or induced, must necessarily be high. Such pastures are basically of the ryegrass-white clover type. Additional species are frequently present and desirable. Nevertheless, if it is possible to establish and maintain a ryegrass-white clover sward, relatively heavy concentrations of meat- and milk-producing animals are possible.

With these two species as the basis of the mixture, additional plants are added according to the existing climate and topography, as well as the intended use to which the pasture is to be put. In the northern districts paspalum will thrive, and on account of its high summer production is frequently included in the mixture to provide feed when the ryegrass is at its lowest state of production. Similarly, red clover may be added. Being deep rooted it is better able to survive the dry summer weather and frequently produces valuable summer and autumn feed.

Plants such as cocksfoot and timothy are frequently sown, particularly in the southern districts, and provide good summer feed. In some areas where the soil is liable to dry out in the summer the use of subterranean clover has proved to be of great value for the provision of autumn, winter, and early spring fattening and milk-producing feed. At the other end of the scale where conditions are wet meadow foxtail and strawberry clover may be used. On some of the drier country that is used for fat lamb production rather than dairying crested dogstail is added. This grass, which is very palatable, produces valuable early spring feed. In order to provide early feed and to assist in the suppression of weeds a light seeding of Italian ryegrass is frequently advisable. It is impossible to suggest a universally suitable seeds mixture for the production of high-class fattening pastures. What may be satisfactory for one set of conditions may be quite unsuitable for another. The following, however, should serve as a basis on which a suitable mixture may be built:—

Typical Seeds Mixture Suitable for High-producing, Fattening Pastures.

Well-drained, Rich Country.

	Lb per acre.
Certified Italian ryegrass	5
Certified perennial ryegrass ..	20
Certified cocksfoot	8
Certified white clover	2
Certified Montgomery red clover	2
Certified broad red clover	1
Total	38lb

In the northern districts paspalum figures largely as an important constituent of high-producing dairy pastures.

In the warmer districts where paspalum thrives and where the inclusion of this grass is desired the above mixtures may be adjusted to contain paspalum at 5lb per acre and cocksfoot at 5lb per acre.

Rich, Slightly Swampy Country.

	Lb per acre.
Certified Italian ryegrass ..	5
Certified perennial ryegrass ..	15
Certified white clover	2
Certified Montgomery red clover	2
Timothy	5
Cocksfoot	6
Meadow foxtail	4
Total	39lb

Alsike clover may be added to the above mixture if conditions are too wet for red clover to thrive. In the warmer districts where paspalum may be desired cocksfoot, timothy, and meadow foxtail may be reduced and replaced by paspalum at 8lb per acre.

The best fat lamb pastures are situated on well-drained, moist soils, and consist largely of ryegrass and white clover.

Rich Country Liable to Dry Out in the Summer.

	Lb per acre.
Certified Italian ryegrass	5
Certified perennial ryegrass ..	15
Certified white clover	2
Certified cocksfoot	10
Certified Montgomery red clover	3
Certified broad red clover ..	1
Crested dogstail	2
Total	38lb

In some districts where white clover is liable to die out in unusually dry spells the inclusion of 2lb per acre of subterranean clover in the foregoing mixture is recommended. This sowing of subterranean clover enables a good clover bottom to the sward to be retained. In wet seasons the white clover will dominate and in dry seasons its place is filled with subterranean clover. Neither the one nor the other becomes completely dominant, but sufficient of either is always present to take up the running according to the season.

For pastures sown down chiefly for the purpose of producing hay, heavier seedings of Italian ryegrass and red clover are usually made. Such a mixture will in the first year or two produce a large quantity of herbage ideally suited for the making of good-quality hay.

Although paspalum is frequently sown in a general seeds mixture, its establishment under these conditions is slow and frequently unsatisfactory. If a good and rapid cover of paspalum is required, it should be sown pure in November or December. Sometimes it is sown with soft turnips or Japanese millet. In the early autumn the establishing pasture should be harrowed and sown with ryegrass, white clover, and subterranean clover. This practice enables a dominant paspalum sward to be established much more satisfactorily than is the case when the paspalum is sown in the general mixture.

As an adjunct to the typical permanent pastures just discussed occasional use is found for what are called special-purpose pastures, consisting as a rule of one dominant species. Such pastures are neither common nor very popular, chiefly on account of the limited grazing that is available and the extra care that has to be taken with them.

One of the commonest special-purpose pastures sown is that employing prairie grass as the dominant plant.

On warm, fertile soils prairie grass produces good hay crops in addition to winter grazing.

As prairie grass requires high fertility and a warm climate, its use is limited to the northern districts. Under these conditions prairie grass will provide a large quantity of out-of-season feed that is relished by stock. Consequently, it is useful for the production of winter milk. Provided that it is not grazed too closely, prairie grass will remain for many years under cattle grazing. When it is fed off by close-grazing animals such as sheep or horses it dies out rapidly.

Prairie grass pastures are usually sown out in the autumn with a mixture of prairie grass at 70lb per acre and red clover at 6lb per acre. Stocking should be light in the initial stages. In order to encourage the prairie grass a hay crop should be taken the following summer. Future management should consist of winter grazing and the cutting of summer ensilage or hay crops. It should be fully appreciated that for prairie grass to be of any value the soil must be very fertile and the climatic conditions warm. Where both of these conditions do not apply together the sowing down of a pasture with prairie grass is useless. A lack of appreciation of these facts has led to many failures and consequent disappointment.

Phalaris tuberosa is also used occasionally to form special-purpose pasture. It is difficult to establish in a mixture and should always be sown pure in clean land at the rate of 10lb per acre. It produces well in the winter, as does prairie grass, and will stand repeated haying and hard grazing by cattle. Its use is, however, not widespread, and there does not appear to be much justification for its general use.

In the pumice country of the North Island a cocksfoot-red clover pasture has been developed. Cocksfoot when not sown in competition with other grasses establishes quite rapidly, and contrary to common opinion makes rapid growth in the early spring. To obtain such a pasture the following mixture is sown with a swede or soft turnip crop:—

	Lb per acre.
Certified cocksfoot	5
Certified red clover	5
Certified white clover	1
Total	11lb

This mixture provides a heavy growth, which may be used for either grazing or ensilage. Frequently the summer roughage is left for a rough grazing in the winter, and following this winter grazing the cocksfoot produces quite well in the early spring.

Another special-purpose pasture is that composed of pure certified Italian ryegrass. This type of pasture has been developed during recent years in Canterbury. The seed is drilled in in January and the pasture is ready to feed off in about six weeks' time. After being grazed again in the spring it is shut up for a seed crop, which is usually cut in time to allow the paddock to be ploughed in January. The sowing of pedigree or mother seed Italian ryegrass is advisable in order that the best return may be obtained from the seed crop.

The foregoing discussions on mixtures may be regarded as indicating the ideals for the sowing down of high-class wet stock pastures. It should, however, be realised that all of New Zealand's meat and milk is not necessarily produced from pastures containing mixtures of the foregoing grasses alone. In fact there are many thousands of acres producing fat lambs and butterfat which contain only small proportions of the grasses and clovers just discussed. For example, many such pastures contain high proportions of other grasses and clovers, including yorkshire fog, suckling clover, knee-jointed foxtail, and sweet vernal, to say nothing of many weeds such as catsear, ribgrass, thistles, ragwort, and docks. Although the livestock produce from such pastures is considerable, they cannot by any means be regarded as being as desirable as those containing the more useful and more highly productive pasture plants.

There is, however, a very considerable tendency throughout the country for pastures on the heavier land to be left alone, irrespective of their com-

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position. On account of the fact that they do produce a relatively high quantity of feed, they are left down to produce what they can rather than be replaced by a sward of high-producing grasses and clovers. Consequently, it is not uncommon to find some of our best pastures on the lighter soils that have been artificially brought to a state of high fertility. Conversely, many of the pastures on the heavier land are relatively poor. There is little doubt that many of these pastures could with distinct advantage be ploughed and resown. There is a common impression that because a pasture is very old it must be very good. Actually, age in a pasture has no inherent virtue. The only virtue that any pasture has is that of high production of useful feed. If, being old, it is producing the maximum possible, then its age is an interesting incidental, but is certainly not a matter of major importance.

About one third of the country's grasslands have been derived from native bush.

2. The Unploughable Permanent Hill-country Pastures Derived from Scrub and Bush Land.

This type of pasture represents about one-third of the total area of grassland. Most of the sown hill-country pastures are in the North Island, although some are in the high-rainfall areas of the South.

The felling of the bush commenced with the earliest settlement, but did not reach its peak until after the termination of the Maori Wars and was carried on extensively until 20 to 30 years ago. Since then the felling of bush has continued, but on a much-reduced scale. Two main factors were responsible for the conversion of this bush country into grassland. One was the construction of the railway line from Wellington to Auckland, together with its branches. The other was the stimulation given to the rearing of livestock by the extended use of refrigeration.

Frequently the seeds mixtures sown on many of the earlier bush burns left much to be desired. As a rule ryegrass, cocksfoot, and mixed clovers were the chief plants sown on the burns. Many farmers, however, bought seed which was sold as being "suitable for rough country and bush burns." Much of this type of mixture was of extremely poor quality and quite unsuitable for sowing on any country, let alone on bush burns. Actually, mixtures for bush burns require to be the best possible in both mixtures of species and in quality of seed. The fact that it is just rough hills that are to be sown out does not mean that any sort of seed will do. On hill country the first sowing is usually the only one possible, whereas on the easier country, if a pasture runs out, it may be ploughed and resown. Following a burn the soil is in a relatively high state of fertility. Part of this fertility is due to the humus that has accumulated on the surface for many years and part is due to the large quantity of ash that is left after the fallen timber and undergrowth have been burnt. The ash also leaves a seed-bed which, when sown upon soon after the burn, provides a very satisfactory medium for the establishment of seedlings.

Mixtures that contained only plants demanding high fertility, such as perennial ryegrass, cocksfoot, and white clover, produced excellent growth, which provided good food for a year or so. Usually, however, the fertility dropped fairly rapidly, and these high fertility demanding plants died out, leaving blank spaces to be filled in with whatever would grow. Nearly always there was something ready to grow. Those plants that did grow were almost always indigenous plants. Any plants that were palatable to stock were liable to be eaten out, leaving only those plants that

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were unpalatable. Hence there was frequently a marked tendency for bush burn sowings to tend to revert to an association of native plants, the majority of which were unpalatable to stock. Plants such as bracken fern, bidi bidi, manuka, and hard fern are all unpalatable to stock, and together with a number of other native plants constitute a group that interfere seriously with the maintenance of hill-country pastures.

A bush burn mixture is therefore not satisfactory if it contains only plants that are both short lived and demanders of high fertility. Such mixtures should contain plants that, when the initial fertility drops, will maintain a dense ground cover for a long period. In order to secure such a cover it is necessary to utilise plants such as browntop, *Poa pratensis*, and *Danthonia pilosa*. These plants are quite rightly regarded as being undesirable on rich dairying country, but on the poorer hill country there is no doubt at all that they are extremely valuable. It is surely better on hill country to have a permanent sward of low-producing but permanent grasses rather than a high-producing temporary sward composed of short-lived plants.

A bush burn mixture should therefore contain both high-producing short-lived plants and permanent low fertility demanding plants. In addition to this it is necessary to provide for the grassing of a diversity of conditions of fertility, soil moisture content, and aspect. Consequently it is impossible to suggest one mixture that will be satisfactory under all circumstances. The following mixtures, however, with modification to suit various conditions, can be recommended.

A four-year-old bush burn. This type of country should be sown with grasses and clovers that are able to survive under conditions of low fertility.

	Sunny faces. Lb per acre.	Shady faces. Lb per acre.
Italian ryegrass ..	4	4
Perennial ryegrass	10	10
Cocksfoot	8	8
Dogstail	2	1
Browntop	1½	2
Danthonia pilosa ..	3	1
Poa pratensis ...	1	—
White clover	2	2
Lotus major	1	1
Totals	32½lb	29lb

Turnips, which grow particularly well following a bush burn, are frequently included in the mixture at the rate of half a pound of seed per acre. Such mixtures are subject to very considerable modification.

On the better class of hill country *Danthonia* can be reduced or eliminated and the ryegrass and dogstail increased. Subterranean clover can be introduced in the warmer districts and where hill country topdressing is practicable. On the poorer class of land the quantities of browntop and *Danthonia* can be increased at the expense of ryegrass and cocksfoot. Under dry conditions, yarrow and chewings fescue may be included. In the northern districts paspalum may be included to replace some of the cocksfoot. In the south, timothy is useful in the wetter portions and on back-lying faces.

On hill country that has been grassed following bush burns, *Lotus major* has proved to be of great value in two main respects: Firstly, its presence draws stock into areas that otherwise would be grazed only very lightly. This action assists in the destruction of noxious plants such as bidi-bidi fern and young secondary growth. Secondly, *Lotus major* serves as what may be regarded as an automatic fill-up plant—that is, it rapidly establishes in bare spaces resulting from a broken turf.

Secondary Burns

The seeds mixture that should be sown on secondary burns depends firstly on the initial fertility resulting directly from the burn itself, and secondly on the ultimate fertility of the soil. In general, the soil fertility following a secondary burn is lower than that following a primary burn. In addition to this, the ash, which is a source of fertility and also a seed-covering medium, is considerably less. Consequently lower fertility demanding grasses should dominate the mixtures.

Typical well-grassed bush country where ryegrass, white clover, *Poa pratensis*, dogstail, and cocksfoot are the dominant pasture plants.

The following can be regarded as a general mixture for secondary burns:

	Lb per acre
Certified perennial ryegrass	8
Browntop	3
Danthonia	2
Crested dogstail	3
Poa pratensis	1
Lotus major	1
Certified white clover	1
Total	19lb

Where the burn has resulted in a good quantity of ash and where the fertility is reasonably high, some 4lb of certified cocksfoot should be added.

Such a mixture as the foregoing should provide early feed, chiefly through the perennial ryegrass, and a permanent dense sward with the *Danthonia*, browntop, and *Poa pratensis*. Provided that the fertility is reasonably high, the cocksfoot and crested dogstail will persist for many years.

If topdressing is to be carried out, the addition of 2lb of subterranean clover in the warmer areas is advisable. This clover when once established will with topdressing form a very valuable additional legume. *Lotus major*, as has already been explained, is an extremely useful plant on hill country.

Bracken Fern Control

Bracken fern is a widespread indigenous plant that frequently becomes the dominant plant covering on former bush country. It is a perennial plant which spreads by means of underground runners. In the spring these runners throw up fronds which at first appear in a curled stage not unlike the shape of a question mark. These later expand and grow rapidly to form tall, harsh, and unpalatable fronds. Although these fronds die in the autumn they remain standing.

Large areas of bush country have for various reasons reverted to secondary growth. In clearing and regrassing this country a good proportion of low fertility demanding grasses should be sown.

When the fronds are in the curl stage they are very susceptible to injury, and it is on this fact that the most satisfactory method of control is based.

On unploughable country the fern is burnt in the autumn and sown down as soon as possible with a mixture similar to that recommended for other secondary burns. As the bracken is dormant until the spring, stocking of the area is not advisable until then. This will allow the grasses and clovers to become thoroughly established. In

The crushing of bracken fern can be carried out most satisfactorily in the spring, when the frond is in the tender curl stage.

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the spring when the fern is in the curl stage cattle may be crowded on the area. This crowding results in many of the fronds being broken off. Once a frond is broken it cannot grow again. The success of bracken fern control depends almost entirely on the results of this initial crushing. In order that the maximum crushing effect may be secured, small rather than large areas should be dealt with, and it is seldom that areas of over 100 acres in extent can be successfully crushed. This entails considerable expense in labour for fencing, but without this subdivision satisfactory control is not possible.

Manuka Control

As a rule manuka invades second- and third-class hill country, where it frequently takes charge of very considerable areas. Such country is often at best suited for the growing of low fertility grasses such as *Danthonia*, chewings fescue, and browntop.

Manuka is a prolific seeder, and this, coupled with the fact that it is not damaged by grazing animals, precludes the possibility of controlling it through stock manipulation.

On unploughable hill country where the plants are small and scattered hand pulling is effective. If the plants are not large but are too numerous to pull by hand, then the repeated burning of the whole area is advisable. In order that a burn may be successful, a good growth is necesasry for the carrying of the fire. The best grass for this purpose is *Danthonia*, which not only carries a fire well but also comes to little or no harm itself in the process. Consequently the most satisfactory control of manuka may be secured on *Danthonia* dominant country.

Manuka should be cut and burnt and then sown with a mixture of low fertility demanding grasses.

Where the manuka is tall and dense cutting and burning, although expensive, is the only satisfactory method of control. A fierce fire that will consume all or most of the seed capsules is essential. Such a fire can usually be secured about 5 to 6 weeks after the manuka has been cut. If left longer than this, the leaves drop, with the result that insufficient heat is generated for the destruction of the seed capsules. Following the burn a seeds mixture should be sown in which *Danthonia* is an important constituent. As *Danthonia* is slow to establish, it is necessary to add other species that will establish and provide feed rapidly.

The following mixture is recommended:—

	Lb per acre.
Perennial ryegrass	6
Crested dogstail	3
Danthonia	3
Browntop	1
Poa pratensis	1
White clover	1
Lotus major	1
Total	16lb

When ample ash is left following a burn of heavy manuka 4lb of cocksfoot may be added. This mixture will in time produce a *Danthonia* turf which will be capable of withstanding the repeated later burning which will almost certainly be necessary.

Subterranean clover is of great value on country that is liable to dry out to such an extent that white clover cannot survive permanently.

Hill-country Topdressing

Much of the hill country is of low fertility and is consequently carrying only a fair sward of comparatively low carrying capacity. In recent years increasing attention has been paid to the improvement of this country by topdressing with phosphate. For phosphatic fertilisers to be of value it is essential that clovers capable of vigorous growth are present in the pasture. Without clovers most of the value of the phosphate is wasted. As a rule this low-fertility hill-country pasture contains very little clover, except for small quantities of stunted white clover, together with suckling clover, and occasionally clustered clover and striated clover.

Consequently, in order to make the best use of the phosphate, it is necessary to introduce a clover that will respond to this topdressing. Of the various clovers that are available for this purpose white clover or subterranean clover is the most useful. Under suitable conditions these clovers will form a permanent and valuable portion of the sward.

The old practice of feeding cattle on a ripe clover pasture and then turning them up into the hills to spread this seed has much to commend it. There is little doubt that a tremendous quantity of clover seed has been spread over the hill country in this manner.

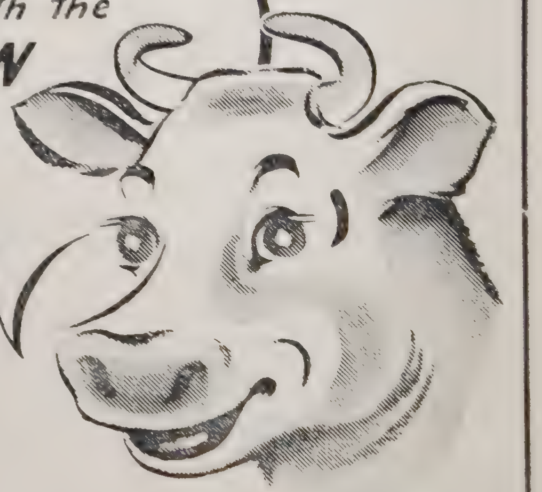
In districts where white clover will grow it is this clover that should be introduced. There are, however, considerable areas where white clover will not grow, owing either to low rainfall or to the soil being incapable of retaining sufficient moisture. It is on this type of country that attention is now being paid to the introduction of subterranean clover. On consolidated sand country in the North Island the use of subterranean clover has, with the use of phosphate, done much not only to provide good feed but also to stabilise the sand.

A considerable amount of experimental work has been carried out on the introduction of subterranean clover into hill country. Results have been rather conflicting, sowings on both cultivated and uncultivated ground giving varying results. On the whole surface sowings have been quite satisfactory in the drier areas of the North Island, particularly on the eastern coast.

The whole question of the topdressing of hill country depends on its cost relative to the value of the results obtained. Where the results obtained do not cover costs the practice is of course not sound. But when the topdressing enables more or a different type of stock to be carried it has frequently been found to be profitable.

Hill-country Erosion

This age-old process consists of the removal by various agents of the existing surface soil and the deposition of it elsewhere. This process has been in progress for countless years, and has resulted in the reduction in height of many mountain ranges and the filling up of the intervening valleys. In a great many ways this process of erosion has been the direct cause of the formation of some of the best farming lands in this and other countries. All our rich alluvial plains, our built-up lake beds, and many of the shingle plains are the results of erosion. This natural process is gradual and inevitable. Man, however, has, in a great many areas, hastened this process to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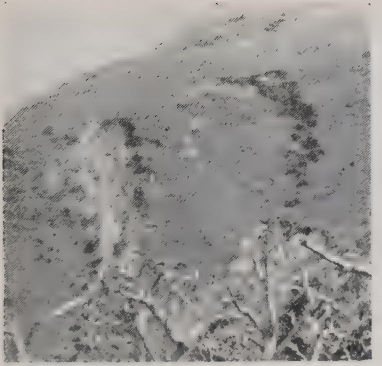

Much of our hill country is scarred with slips and other forms of erosion. It should not be forgotten, however, that many of these slips may in a few years' time be successfully regrassed. Above are two slips, the one on the left is new, while the one on the right is old and covered with a good sward of grass.

such an extent that the loss of the soil from the hills has become so extensive that marked land deterioration is taking place. In addition to this the soil that is removed may frequently be washed out to sea and virtually lost, or it may be deposited in large quantities on good pasture or cropping land, thus practically ruining it, for a time at least.

In New Zealand no vast erosion problem exists that is in any way comparable with that present in parts of the North American continent or Australia. Nevertheless it is necessary that precautions should be taken to ensure that erosion does not get to the stage where it becomes really serious. Erosion is brought about by two main agents, namely, wind and water. Wind erosion can take place only when the plant covering is removed. In the early days of settlement the strong north-west winds in Canterbury resulted in tremendous soil losses. Large areas were under cultivation and there was virtually no shelter of any kind to break the wind. With the establishment of many shelter belts and a tendency for a smaller area of ground to be ploughed, the wind erosion on the Canterbury Plains, while not a thing of the past, is certainly of much less moment than it was years ago.

On much of the hill country of the tussock lands of the South Island wind erosion, together with water erosion, is now a problem of very considerable moment. With the dying out of the tussock following its burning and grazing the ground has been left bare. Much of the soil has been removed by the action of rain, frost, and wind, leaving shingle slips, bare rock, or only a thin covering of soil. How this erosion can be effectively and economically arrested is a matter of considerable concern and discussion. It is questionable whether some areas can ever be effectively restored. On the other hand, there are many that with re-vegetation can probably be successfully stabilised. This re-vegetation must be carried out in conjunction with very light grazing and spelling.

In the North Island the main erosion problem is that associated with the high rainfall experienced. With the former covering of bush or scrub, erosion took place on a relatively small scale, and soil movement was slow and not far reaching. With the removal of the bush by felling and burning the natural soil movement was accelerated, particularly on the steeper country. It was accelerated to such an extent largely due to the fact that plant covering, following the falling of the bush, was insufficient to retard the rate of run-off of the rain water. This resulted in many types of erosion ranging from the not very conspicuous but quite serious sheet erosion to the large slips which are very conspicuous parts of the landscape in many hill districts.

Erosion on hill country is very closely related to soil fertility. Where the soil is sufficiently fertile to maintain a good sward then erosion is seldom serious. On the other hand, where only a poor pasture is present erosion is common.

From the farming viewpoint at least this question of fertility is one that must be taken into account in any programme in the combating of erosion.

One not infrequently notices sheep and dairy farms on adjoining properties, both of which are similar with regard to topography. The pastures on the dairy farms are of a much higher fertility than are those on the sheep farms, with the result that on the dairy farm erosion is almost non-existent, whereas on the sheep farm it is most conspicuous.

To what extent it is possible for the sheep farmer to raise the fertility of his land to a state that will ultimately prevent erosion is debatable. There is no question that much has been done in this direction through the topdressing of hill-country pastures and the consequent encouragement of the clovers, particularly white clover and subterranean clover. Much land has, however, reached the stage where such improvement is no longer possible, and it is this country that at the present time is the cause of so much concern.

3. Tussock and Other Native Grasses.

At the time settlement commenced large areas of country were covered with various native grass associations. The greatest area of this was in the South Island and lay to the east of the main dividing range. It covered many of the hills, shingle plains, and inland basins alike. In the North Island native grass vegetation covered only limited areas. Fairly extensive areas of tussock were present on the central plateau, while native grasses such as *Danthonia*, fescue, and *Poa* tussocks covered some of the country on the lower-rainfall areas of the eastern area of the southern part of the island. This native grass vegetation was very mixed in composition and contained grasses ranging in size from the diminutive dry country *Poa maniototo* to the tall toetoe. Some of the grasses were of a tussocky habit, others were mat forming. Large areas of country were covered with a grass association dominated by either hard tussock, silver tussock, snowgrass, or red tussock. The fact that the country was

On some of the low-rainfall tussock country of the south, wind and water erosion is very marked and is responsible for the shifting of large quantities of shingle and other debris.

Typical unaltered tussock country with snowgrass the dominant plant.

clothed with plants of this nature is not surprising for two reasons:—

Firstly, for thousands of years the vegetation was not interfered with to any appreciable extent by man or animal. The country had in it no browsing animals and interference by man was negligible, except for occasional fires started by the travelling Maoris. Consequently the vegetation was able to adjust itself to a type best suited to its unhampered growth and survival.

Secondly, as bush and scrub dominated the higher-rainfall areas the tussock was able to compete with other plants and survive only where the rainfall was too low for forest or scrub to grow. The grassland community consequently consisted in the main of plants that could survive under conditions of low rainfall. As a rule such plants are xerophytic in nature, that is, they are so formed that they are enabled to withstand long periods of drought without harm. In the grasses this character is usually one of the toughening and inrolling of the leaves. Consequently most of the native grasslands were composed of grasses of this type. Although the tussock grasses were the main components of the native grassland association, many other smaller grasses, together with various small herbaceous plants, were present. It was these smaller plants growing in the shelter of the tussocks rather than the tussocks themselves that provided the feed for the sheep and cattle. The tussocks themselves with a few exceptions were harsh and unpalatable to stock, which would not feed from them unless hard pressed. It was soon found out, however, that the young growth that came away rapidly from the crown of the tussock following spring burning provided feed acceptable to stock. The burning of the large quantity of top growth also had the effect of opening up the crown, thus enabling the smaller and more attractive plants to increase. This practice of periodic burning was carried out for a number of years. The immediate gains were satisfactory in that for a time an increased number of stock were carried. Repeated burning had, however, the effect of reducing the vigour of the tussock plant to a very low ebb. So much so that, in the drier districts particularly, the tussock dried out completely. This death of the tussock was hastened very considerably by the grazing of the sheep and later by the concentrated grazing of the multitude of rabbits that rapidly became a swarming menace on much of the lower-altitude tussock country. In any plant association when any individual or group of individuals dies out there is nearly always some other individual or species to take its place. It is very seldom that the ground is left absolutely bare if it is not undisturbed.

This process took place throughout the tussock country. According to the various conditions of climate and interference by stock so did different associations or alterations in the existing association come into being. These changes have been taking place ever since the tussock land was first used for pastoral purposes. As far as the land being used for farming is concerned there are now three major associations present.

Firstly, there is the association now present in much of Central Otago. The climate there is hot in summer and cold in winter. The rainfall is very low (12 in. average annually), and the rabbits are plentiful. Under these conditions the major association, particularly on the sunny faces, is one of scabweed mainly, together with an association of several annual grasses and a few herbs, many of which die out in the summer. On back-lying faces, in gullies, and on the higher levels the tussock still persists.

The second association on the tussock country is the one that is somewhat like the original association. There, there is a good cover of tussock and small herbs. Throughout the association there is, however, a fair sprinkling of introduced plants, such as browntop, catsear, hairgrass, and Yorkshire fog. This is what is now regarded as the best of the tussock country and is present chiefly on the higher-rainfall areas (up to 25 in.) and where rabbits are not plentiful and where stocking by sheep is not heavy.

The third association is one that has been very considerably modified from the original and is present on the 35 in. rainfall areas. This is mainly the one-time silver tussock dominant coun-

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Depleted tussock country in the South Island. This condition has been brought about largely by burning and heavy stocking with both sheep and rabbits.

try. Here the tussock has gone out to a considerable extent and has been replaced very largely by plants such as browntop, sweet vernal, catsear, Yorkshire fog, and some other plants of a higher fertility requirement, such as white clover, dogstail, cocksfoot, and even ryegrass. On this country the dying out of the tussock has little or no harmful effect, as the plants that have replaced it are much more valuable than the tussock itself.

There has been much discussion on the palatability of the various tussock grasses. In general they are all unpalatable when fully grown, but following a burn many of them are relatively attractive. There are, however, one or two that stock eat comparatively readily without preparatory burning. These include the blue tussock and the blue wheat grasses.

With regard to these three types of modified tussock grassland it would appear that they are all now in a more or less stabilised condition. The depleted country is not likely to deteriorate much more as far as vegetation is concerned. The more or less original tussock-land association under the present mangement is also likely to remain in much the same condition as at present, with a tendency for more and more exotic vegetation to become part of the association.

In the third type, that is the type that also has been modified to the exclusion of the tussock, the intrusion of exotic grasses will probably continue that tendency under present management until the tussock becomes of little account. There is, however, a tendency for some of this type of tussock grassland which is on the border of the scrub and bush country to change not to exotic grasses but to the native and unpalatable manuka, fern, and tutu. This tendency is already quite marked in some districts where one-time tussock country that has been interfered with is changing to dominant, and from the grazier's viewpoint, useless, manuka.

There is one other native grass association that has not been referred to, and that is the *Danthonia pilosa* and *Danthonia semiannularis* association. In the country's primitive state these *Danthonias,* although scattered throughout as a component of the natural grasslands, occupied only small areas as dominants in the grassland association. With the bringing in of large areas of low-fertility, bush-clad hill country this *Danthonia* was spread both deliberately and accidentally. *Danthonia* will both stand up to and thrive on repeated burning, and much country has been saved from reversion by the fact that this grass carries a low fire well and will continue to spread under these conditions. On the poorer country of the drier areas of the North Island *Danthonia* has spread over wide areas and is thus very useful.

There are a number of other native grasses, few of which are of importance as fodder plants. Ratstail, which is an introduced grass, has in some districts become very aggressive. As a rule ratstail is confined to the warmer and sweeter soils and thrives in areas that are relatively free of frosts. It is frequently associated with *Danthonia,* which it tends to dominate if left to grow unchecked. It has been found that on suitable country a reasonable degree of control of ratstail can be secured. The area is burnt in the autumn, surface cultivated, and sown down with a suitable seeding of grasses and clovers. Subsequent topdressing assists in its reduction.

Silvery sand grass is a comparatively useful sand-binding agent, but is not as satisfactory as marram grass for this purpose. Of the remaining native grasses very few are of agricultural importance, except for the fact that as a component of the main grassland association they provide a certain amount of feed for stock.

Typical *Danthonia* country in Hawke's Bay.

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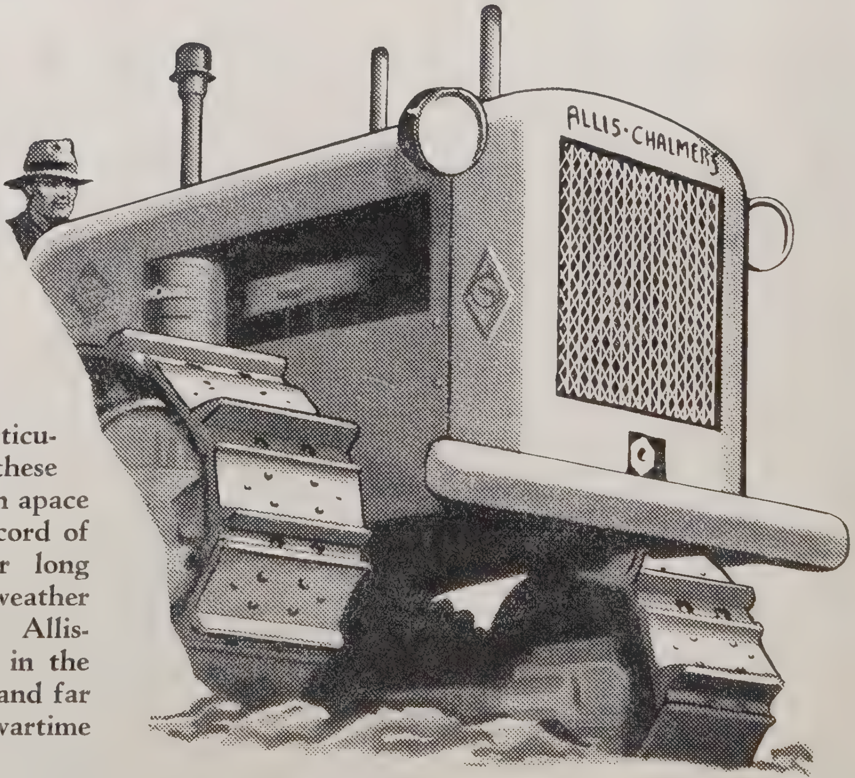

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With regard to the sowing out of pastures of any kind with native grasses, there is no evidence that any except *Danthonia pilosa* and *Danthonia semiannularis* are of any value for this purpose. *Danthonia* has, however, been sown extensively as described earlier. The remaining grasses are either too unpalatable for stock, unable to stand up to the grazing, or not sufficiently productive.

One outstanding fact from the agricultural point of view regarding the native grasslands was the complete absence of useful leguminous plants. In its original state none of the tussock or *Danthonia* country contained any clovers at all. Over a period of years, however, several introduced clovers have become established to a greater or lesser degree in the various types of the tussock country. In the higher-rainfall areas and where the fertility is reasonably high white clover and suckling clover are both present to an appreciable degree and are of considerable value. In the areas where the tussock association has not been greatly altered suckling clover is now very common. White clover is also present, but is seldom seen in a thrifty condition.

On the very dry areas suckling clover is present, but produces very little. Haresfoot trefoil is also present in certain parts, but is of practically no value on account of its extremely low production of feed.

4. Permanent Low-producing Pastures on Land that has at One Time been Ploughed.

This is a group of pastures of many types and not a pasture of any specific combination of grasses and clovers. It embraces in the main the type of low-producing sward that has resulted from the sowing out of pastures on second-class country following repeated cropping. These pastures are frequently quite old and in composition have no resemblance to what they were for the first few years after sowing down. They are in effect pastures consisting of grasses that will survive under conditions of low fertility. On account of this low production they are as a rule of low carrying capacity also. There are many such grasses which under conditions of low fertility are of value. There are also a number of grasses dominating this type of pasture that are quite undesirable. As a rule, on the sour, cold clay country browntop rapidly tends to dominate. In certain areas where the soil is fairly free and where the land has been cropped very considerably twitch grasses, such as "old man" twitch, *Poa pratensis*, creeping fog, and onion twitch, often dominate large areas. On the drier country and particularly on shingle plains chewings fescue and "dryland" browntop often form almost pure associations. On lighter country still hairgrass may be the dominant plant. In practically all of these pastures legumes are either absent or only very sparse. Of these legumes suckling clover is the most common and will maintain itself quite well. The amount of feed that it produces is, however, very small.

Rolling browntop country in the South Island. With the application of lime and phosphate this country will produce first-class fattening pastures.

These types of grassland are being discussed not so much from the point of view of the grassland itself, but from the aspect of leading up to a discussion of what can be and is being done to bring about an improvement in them. Considering the browntop country first: Two courses have been adopted. One of these is the improvement of the browntop sward itself by topdressing with lime and phosphate. Many farms have been very greatly improved by this means. This treatment actually results in a change in composition of the pasture from a virtually pure association of stunted browntop to one of vigorous browntop, often together with some Yorkshire fog, sweet vernal, and clovers. The

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treatment at first stimulates the suckling clover and later the white clover, with the result that a dominant browntop-white clover sward is formed. This type of pasture will fatten lambs, is easy to manage, and will last for an almost indefinite period without renewal. The other alternative is to plough, clean the ground with one or two crops, lime heavily, and sow down with good permanent strains of grasses and clovers. Some people consider that this cannot be done, that it is not economic, and that even when it is done the stock do not thrive on such a pasture. While this may have been the experience of some people, there are a great many that have found it most profitable. It has, however, been profitable only when a suitable mixture of seed has been sown on land that has been raised to a sufficiently high state of fertility to enable the sown grasses and clovers to thrive. In addition to this the pasture when it is established must be managed so that the feed that is produced is utilised in the best possible manner.

A seeds mixture for the sowing out of this country should aim at the provision of sufficient clover to enable the pasture as a whole to thrive. The following mixture is recommended:—

	Lb per acre.
Certified Italian ryegrass	5
Certified perennial ryegrass	25
Certified cocksfoot	8
Certified Montgomery red clover	4
Certified white clover	3
Total	45lb

Such a mixture will give early feed soon after sowing down and will also form a high-producing, fattening pasture, provided always that the fertility is raised to and maintained at a sufficiently high level.

On the drier country where the pastures have gone back to the various twitches or to hairgrass topdressing alone is of no value. The only result thus obtained is the stimulation of the suckling clover with little effect on the twitches or the hairgress. There is no way of bringing such country back without reseeding, and this can best be effected following a ploughing and, in the case of twitch-infested areas, thorough cleaning.

Any attempt at the sowing of a satisfactory permanent pasture on this type of country must be associated with the introduction of a satisfactory clover. In many districts it has been found that subterranean clover serves admirably both as a fertility builder and as a producer of feed. Associated with this clover should be grasses such as ryegrass and cocksfoot. The following mixture is recommended for these lighter lands:—

	Lb per acre.
Certified perennial ryegrass	20
Certified cocksfoot	8
Certified Montgomery red clover	4
Certified subterranean clover	4
Certified white clover	2
Total	38lb

5. Short-rotation Pastures

The short-rotation pasture is a type that is essentially associated with arable farming. Arable farming involves periods of cropping interspersed with periods of grassland farming. These conditions usually mean that a pasture will be required for a period of some four years or so, after which it has to be ploughed in the general cropping rotation. In addition to this is the fact that for many years it was not possible to maintain a satisfactory pasture for more than a few years. At the present time short-rotation pastures are becoming fewer and fewer, largely owing to the change-over from grain to meat production and to the fact that with the use of lime and phosphate and permanent strains of

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plants an eight-year rather than a four-year pasture can be maintained. Nevertheless, there are many areas, particularly in the grain and seed-producing districts of Canterbury, where a pasture is left down for only 4-5 years. Such pastures may be used for one or all of three purposes, namely grazing, haying, or seed production. Consequently the mixtures sown are very variable. Where ryegrass and later white clover seed production may be undertaken the following mixture is sown:—

	Lb per acre.
Certified perennial ryegrass ..	30
Certified white clover	3
Crested dogstail	1
Total	34lb

Such a mixture when autumn sown provides early lamb feed, and when the seed crop is cut in January the paddock may then be available for further grazing if the season is favourable.

A pasture sown down specifically for grazing should contain additional species seed, such as cocksfoot and red clover, with a corresponding reduction in ryegrass. A suitable mixture for this purpose is:—

	Lb per acre.
Certified Italian ryegrass	5
Certified perennial ryegrass ..	20
Certified cocksfoot	8
Certified Montgomery red clover	3
Certified white clover	2
Total	38lb

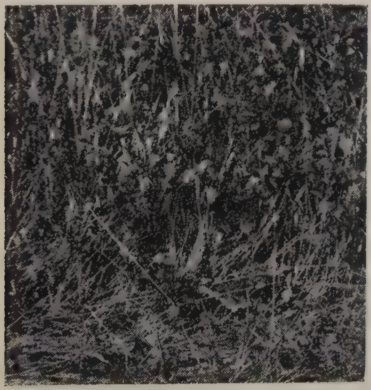
Such a mixture will be suitable for the provision of either grazing or good crops of hay. Provided that they are not hayed every year, such pastures will provide good grazing for five years or more, unless externally damaged by agents such as drought, flood, or grass grub.

In recent years a new type of ryegrass suitable for use in short-rotation pastures has been placed on the market. It is known as Certified H1 ryegrass and may be used to replace both Italian and most of the perennial ryegrass in a short-rotation pasture mixture. A mixture containing H1 ryegrass for use as a short-rotation pasture is as follows:—

	Lb per acre.
Certified H1 ryegrass	25
Certified cocksfoot	8
Certified Montgomery red clover	3
Certified white clover	2
Total	38lb

Under some conditions, such as dry or low-fertility areas, the addition of 5lb per acre of certified perennial ryegrass may be advisable. H1 ryegrass is a hybrid grass combining as far as is possible the best features of both Italian and perennial ryegrass. Experience to date shows it to be highly productive in the spring and very attractive to stock.

Over-drained peat country tends to become rapidly dominated by manuka.



Temporary pastures should be sown with high-producing, short-lived plants. Of these Italian ryegrass and red clover are the best for either hay or grazing purposes.

6. Temporary Pastures.

The use to which temporary pastures are put is essentially that of providing large quantities of feed for a short period, such pastures usually remaining down for no more than two years. Relatively short-lived, high-producing plants are therefore required. On account of the fact that such species are relatively few and that they exert a very considerable amount of internal competition in the sward, a simple mixture is usually sown. The following is typical:—

	Lb per acre.
Italian ryegrass	25
Red clover	5
Total	30lb

Such a mixture when sown in January or February will provide a flush of feed in the autumn, will maintain some growth in the winter when older pastures are at a standstill, and, of course, come away rapidly in the spring. If stocked heavily in the autumn, the pasture will suffer very little damage from frost and will come away early in the spring.

If there is plenty of feed available in other paddocks, the temporary pasture may be shut up for a crop of hay and possibly later still for a crop of red clover seed. As a rule, however, this type of pasture is sown chiefly for the provision of out-of-season feed, and any other uses to which it is put are as a rule incidental.

7. Grassing of Peat Swamps and Bogs.

Peat bogs are present through many of the higher-rainfall areas of New Zealand and have been formed at elevations ranging from about sea level to the mountains. The most extensive areas of peat are those in the Waikato. Those bogs are formed largely through the continued growth of sphagnum moss in wet places. These wet places may be low-lying depressions or sloping ground that is kept continually moist by the outflow of adjacent springs. The sphagnum is sponge-like in texture and is growing continuously under water-saturated conditions. As it continues to grow upwards, the lower vegetation decays and forms peat, which may reach to depths of 40ft. or more. Peat therefore consists almost entirely of decayed organic matter. Although sphagnum moss is the main plant in a peat bog, there are a number of others that will grow on the moist and acid peat. These plants, such as stunted

The surface burning of peat country after ploughing is satisfactory, provided the water-table is high enough to keep the unploughed peat damp.

manuka, the sundews, rushes, and certain heaths, are able to tolerate the very high water-table and the existing sour conditions. From the farmer's point of view a natural peat swamp is worthless; consequently many attempts have been made to convert these to grassland. A reduction in the level of the water-table is the first essential, and when first attempts were made to "bring in" this peat country large, deep, and apparently efficient drains were dug. These drains acted so efficiently that virtually all the water was drained out of the peat, leaving it dry and almost impervious to water. It was then found that the successful grassing of this dried-out peat was practically impossible. In addition to this, the reduction in the moisture content of the peat enabled manuka to flourish, and at the present time large areas of drained peat country are clothed almost entirely by a dense association of this plant.

It is this dry drained swamp rather than the wet natural swamp that presents the major peat swamp problem at the present time. The problem is one of removal of the manuka and the consolidation of the peat to such a degree that it will absorb and permit the movement of water.

In a dry season this unconsolidated drained peat burns very readily and the fire is extremely difficult to put out once it has secured a firm hold. A considerable area of peat country has been burnt both accidentally and deliberately. This burning results in the formation of large, irregularly-shaped holes and the uncovering of much timber. In this condition peat swamps are extremely difficult to deal with. The complete burning of all peat and timber is quite satisfactory, provided that an outlet can be assured for all the water that will accumulate. If this can be done, then the ground can be worked up and sown out with the usual pasture mixture. Unburnt drained peat land being so dry and spongy it is extremely difficult to consolidate sufficiently to enable useful pasture plants to grow. The only plants that will grow under these conditions are Yorkshire fog and *Lotus major*. Even these will establish satisfactorily only where there has been some consolidation. With these plants established and producing feed, stock can be grazed on the area. This grazing and trampling does in time result in sufficient consolidation for better grasses and clovers to become established. In the bringing in of any further areas of natural peat land sufficient but not over drainage is of the first importance. This drainage should if possible aim at the maintenance of the water-table at such a height that will keep the peat damp but not sopping wet.

Where this can be done, it has been found that the surface burning of the ploughed peat assists in the establishment of the grass and clover seedlings.

The following mixture may be sown in areas where paspalum will grow:—

	Lb per acre.
Yorkshire fog	6
Paspalum	5
Browntop	1
Lotus major	10
Perennial ryegrass	10
Total	32lb

The fertility of peat is very low, and relatively heavy dressings of lime and phosphate are necessary. On many peats potash is also required.

8. Swamp Pastures.

Although swamp country is not extensive in New Zealand, there are certain areas that are either continually

On low-lying and swampy country liable to periodic flooding reed sweet grass may form a pure and valuable association.

covered with a shallow depth of water or which are liable to be periodically flooded. Such areas are usually adjacent to rivers and are frequently near the lower and more level reaches. This type of country exists in the lower Waikato Basin, the lower reaches of the Manawatu River, the Taieri River, and the Clutha River. It is also present on many lake and lagoon edges. On this type of country the natural vegetation consisting of rushes, niggerheads, or flax is quite unsuitable for the purpose of grazing, stock. There are two alternatives available for the conversion of this country into useful grazing land. The first is drainage followed by ploughing and sowing down with a suitable seeds mixture. The second is the introduction of useful grazing plants that can compete successfully with the existing vegetation as well as grow under the existing very wet conditions. Very large areas have been drained, and there is no doubt that considerable progress can still be made in this direction. Nevertheless, there are many areas that for years to come will not be drained sufficiently to enable first-class mixed pastures to be established.

In recent years seed production has become a specialised business and is largely mechanised.

Fortunately there are grasses that will grow under practically all conditions that are met with in swamp country. Some of these grasses will grow on land that is permanently covered with shallow water, some will grow where the ground is submerged for long periods, whilst others will grow on ground that is always wet but not subject to prolonged flooding. In considering these grasses they will be dealt with in order of their moisture tolerance, ranging from those that will grow in permanent water to those that will thrive only on moist soil. Firstly there is reed sweet grass. This will grow where there is up to 4ft. of permanent water. In flood periods it may be submerged to a depth of 6ft. or more for several months. It is dormant in the winter in cold districts, but produces a very large amount of feed in the summer months. Next to this grass comes floating sweet grass, which grows throughout the year and will stand prolonged periods of shallow flooding. In the warmer districts Mercer grass (*Paspalum distichum*) will grow under very similar conditions and produces a good quantity of useful and palatable feed during the summer months. During the winter when it is dormant it will stand deep flooding. It will, however, grow only in situations that are not covered by water in the growing season. As its seed does not germinate readily, its introduction may best be secured by transplanting pieces of turf. Reed sweet grass, which is a tall-growing, twitchy plant, also thrives under these conditions. It may be introduced by turfs or by seed. Further up the scale, where the soil is always wet but where flooding is not prolonged, knee-jointed foxtail and creeping bent may form pure associations together with some *Lotus major.* Where the land is slightly drier the more common grasses and clovers begin to make their appearance. Firstly there is meadow foxtail. This is followed by *Paspalum dilatatum,* timothy, *Lotus major,* and ultimately ryegrass and white clover.

From the foregoing it is possible to make certain recommendations.

1. PERMANENT WATER.

Reed sweet grass: Introduce by seed or roots.

Glyceria fluitans is already a volunteer in most of this country and no introduction is therefore necessary.

2. JUST ABOVE PERMANENT WATER LEVEL.

Reed canary grass: Introduce by roots or seed.

Paspalum distichum: Introduce by turfs.

3. WHERE FLOODING IS ONLY OCCASIONAL.

Knee-jointed foxtail, creeping bent: Do not introduce, as usually present.

Meadow foxtail: Introduce by seed.

Paspalum dilatatum: Introduce by seed.

4. WET, UNFLOODED LAND.

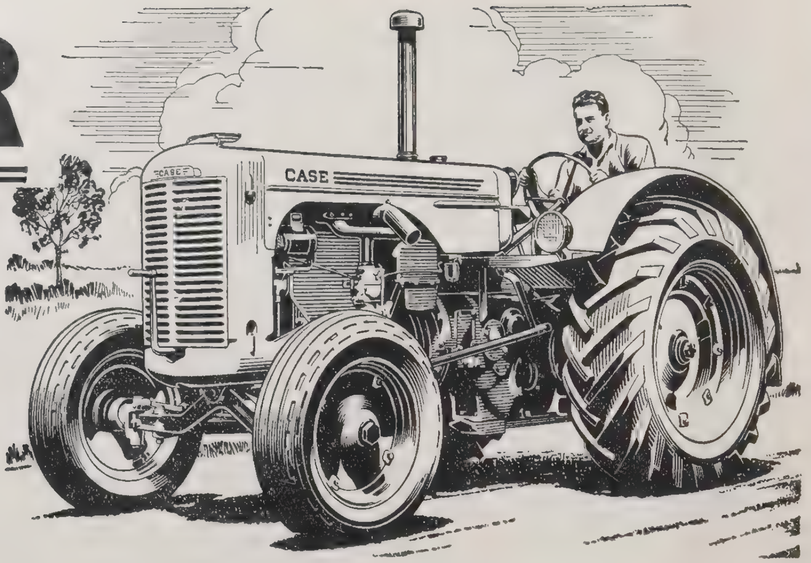
Timothy: Introduce by seed.
Lotus major: Introduce by seed.
White clover: Introduce by seed.
Ryegrass: Introduce by seed.

These swamp pastures consist in the main of aggressive plants which are specially adapted to thrive in their own and rather limited habitat ranges. For this reason pure associations of these various species are usual. In the wettest areas clovers or other leguminous plants are absent, and it is not until one reaches relatively dry ground that these are encountered. On the whole these swamp pastures are highly productive and most of them are of good fattening and milk-producing quality, particularly when the growth is short. It should, however, be remembered that swamp pastures provide no winter grazing, partly because many of the plants are winter dormant and partly because the areas where they are growing are under water for most of the winter.

9. Pastures Sown Down for Seed Production.

In the past seed production was usually incidental to the grazing of the pasture. If the season was good, there was a surplus of feed, and if the feed was not cut for hay, it was frequently saved for seed. As a rule pastures were not specifically sown down for the purpose of seed production. Nowadays, with high prices ruling for seed and with the production of superior strains of pasture plants, seed production has in many instances become a specialised business, and patures are frequently sown down with seed production as the main objective and grazing as an incidental. The question of seed production is dealt with more fully in a later section.

POWER



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The Grass-grub Problem

DURING this season farmers in some parts of the Dominion have again witnessed one of those disconcerting outbreaks of the grass-grub and its beetle, which, from time to time, have been a feature of New Zealand pastoral activities since the earliest days of settlement.

If one peruses the daily and weekly Press, and the journals devoted to agricultural problems, and even the scientific publications of the seventies and earlier, one finds exactly the same story about the grass-grub as is written in the Press of today.

NATURALLY enough one is justified in asking why more has not been done over all these years to put a period to the depredations of this pest; especially when one finds that other insects, so destructive in the early days, have been controlled (e.g., cottony-cushion scale, codlin moth, woolly aphis, diamond-backed moth, etc.). There are several probable reasons; it is only in comparatively recent times that economic entomology has been developed as a scientific service; the insects that have been checked have been more or less amenable to control; unlike most other crops infested by a pest (such as fruit trees, agricultural and garden crops), pastures are not limited to the confines of a few acres where insect depredations can be total, but cover many square miles of country, and no insect, not even the grass-grub, has at any time threatened the whole of this extensive area of grassland; again, at no time in the history of our researches has there been an adequate staff of entomologists to tackle all major insect problems, or at least to enable a sufficient team to concentrate on any long-term project such as that of the grass-grub.

But even if the problem of grass-grub depredations upon pastures remains unsolved at the moment, the insect has been by no means neglected. Though total action against the insect cannot be taken, the information we possess enables us to adopt certain control measures, limited as they undoubtedly are. A review of the position might not be out of place.

Grass-grub Habits

There are several species of grass-grubs in New Zealand, all native to the country; of them, it is apparent, at the moment, that only one species, the common grass-grub (*Odontria zealandica*) is the major culprit. A few of the others are certainly destructive, but their influence is much more localised and their outbreaks more sporadic.

While much remains to be ascertained concerning the habits of the common grass-grub, we have a general knowledge of the main features. As a rule, the great droning flights of the beetle at dusk take place during November and early December; during some seasons and in some localities, however, these flights may commence a week or two earlier. When the beetles appear in epidemic force, as has occurred this season, they devour the foliage of all kinds of plants, including some trees; but what interests the farmer is their destruction of cruciferous crops in the seed-leaf stage, which coincides with the beetle flights.

By

DAVID MILLER,

Cawthron Institute, Nelson.

At this time the beetles enter and infest the ground with their eggs; this may occur even in cultivated ground, especially when a crop is present. The insects seem to be more or less gregarious in this habit, if one is to judge from the isolated areas of grub-infested pasture that are so frequently seen. When feeding upon the roots of pasture and other plants the grubs swallow quantities of soil as well as roots, and, working near the surface as they do, they cause the ground to become pulverised and spongy.

By the close of spring the grubs are well grown. During winter they generally cease feeding, and, according to the severity of the soil climate, descend more or less deeply and there hibernate. With the advent of a rise in spring temperature, the grubs stir themselves and again ascend, continue to feed, and complete their growth. During September and October they reach maturity, cease feeding, and again descend into the soil, where they construct their earthen cells and pupate. This is the chrysalis or dormant stage; but dormant only in so far as feeding and migration are concerned; great changes take place in the pupae, the tissues being recast, as it were, into the form of the adult beetle.

Common grass-grub beetle.

This reconstruction is accomplished at first by only a few pupae; from them emerge the first odd beetles of the season which work their way to the surface by pushing aside the earth with their bulldozer-like heads, and take to the wing. These are the forerunners of the November flights. Emergences from pupation increase daily until the major flights reach their peak. Early in December the numbers of beetles commence to diminish, until activity practically ceases, except for a comparative few insects that have been late in their pupal transformations. Such is the general cycle of the common grass-grub.

Aspects of Control

Though our present knowledge of the grass-grub problem is insufficient upon which to base a satisfactory approach to universal control, yet certain measures can be adopted to meet some phases of the situation.

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1. **Control of Beetles.** The farmer's concern is to prevent his cruciferous crops, for example, from being devastated by the beetle—under these circumstances the attack is sometimes ascribed to "turnip-fly." It frequently happens that the successful establishment of a crop fails owing to the beetle, except after the very considerable expense of resowing the crop several times. This can be avoided to a great extent by a watch being kept for possible epidemics of beetles, and by taking into consideration their flight period.

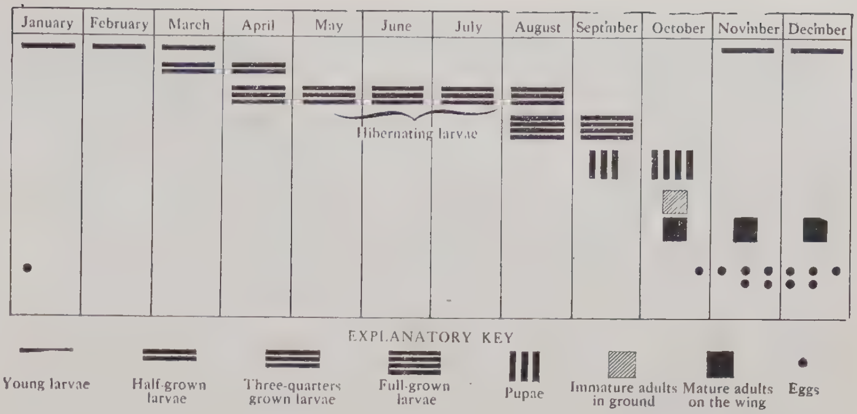

Diagram showing the seasonal changes in the life-cycle of the main generation of common grass-grub.

Every farmer can tell from the condition of his pastures whether the grub is causing damage of sufficient extent to be noticeable; evidence of such damage will be apparent during March and April, and from this early warning it is but reasonable to conclude that heavy flights of beetles are likely to occur in November, necessitating protective measures at that time. It is evident that all farmers in a district should have a common interest in this, because, though little sign of grub attack, if any, is to be seen on one farm, other farms in the district can be severely infested, whence the developing beetles can travel in all directions; a boundary fence is no safeguard.

On the evidence pointing to an outbreak of beetles, precautionary measures should be taken by sowing the crops so early in October that they will be well beyond the seed-leaf stage when the flights of beetles take place; or the sowings can be delayed until the first or second week in December according to the needs and conditions of the district. Thus, if an epidemic flight of bettles does occur, the early crops will be sufficiently advanced to withstand attack, while those sown later will not be in the susceptible seed-leaf stage till the main flight is over.

Apart from farm crops and in the case of fruit trees and garden shrubs, the application of arsenate of lead (at the rate of 1½lb. to 100 gals. of water, plus 1½lb. of slaked lime and a spreader such as casein to ensure a good coverage) will give sufficient protection if applied at fortnightly intervals during the beetle activity. Sometimes, however, as has happened in the case of nurseries where a considerable area of young trees is exposed to attack, spraying is not practicable.

Grub of the grass-grub beetle.

Some years ago Mr. D. J. Buchanan developed the use of smudges and effectively protected the seedlings in the State Forest Service nursery at Tapanui from both the beetles and from later grub infestation. This practice might even be of use in the protection of pastures. Sulphur is copiously spread on strips of scrim, which are rolled up and placed in a number of old paint pots. These latter are stood around and about the nursery, and fired at dusk except during stormy weather; the scrim burns throughout the night and the fumes act as an effective deterrent to the beetles. Mr. Buchanan's observations are worth noting. The Tapanui nurseries had been heavily infested by grass-grubs, resulting in very serious losses. For example, in the 1924-25 season 500,000 seedlings were lost, while in the following season the entire crop of 1,500,000 plants was destroyed. The next year the smudges were applied, and not a single one of the 3,500,000 seedlings covering over five acres had been lost in January (at which time the losses formerly occurred); furthermore, no grubs were found during the course of weeding operations. Another point of interest is that the beetle flights at Tapanui commenced early in December, and many beetles were on the wing throughout the summer; this may have been a species other than the common grass-grub (*O. zealandica*), or the later emergence may have been due to local conditions.

Another problem is the protection of strawberry beds. Though entailing a considerable amount of labour, the beds can be effectively protected during the flight of the beetles by screening them before dusk with scrim stretched on wooden frames. This not only prevents defoliation and damage to the berries, but, by excluding the beetles, also hinders the insects from laying eggs about the roots of the plants, which are thus freed from root damage throughout the season.

The trapping of beetles by means of lights is frequently advocated. A common feature of the Canterbury countryside, during a period of beetle activity, are the bonfires lit to attract and destroy the insects. But this is of little use. Experiments have shown that mainly male beetles are attracted and destroyed; and as there is usually a surplus of males over females, it is largely this surplus that is removed from the competition.

2. **Control of Grubs.** The influence of grass-grubs on pasture land is twofold; not only are the grass roots destroyed, but also, whilst feeding, the grubs break the normal circulation of moisture about the roots by swallowing the soil with their food and later evacuating it. Against these combined

The pupa of the grass-grub.

influences grass has difficulty in surviving, and frequently infested turf can be pulled up, or rolled up as one would a carpet. The damage to roots can be partly overcome in stimulating root development and maintaining a vigorous pasture by means of fertilisers; this is a normal phase of proper farm management. On the other hand, the disturbed soil can be compacted by a rolling so as to re-establish the circulation of moisture; but this is an additional and special activity, and by no means always practicable. It should be noted that rolling has no crushing influence on the grubs themselves.

Though all kinds of grasses are subject to grub attack, the attack on some species is much less noticeable than on others. In general it can be said that the more vigorously-growing grasses suffer ill effects less than the weaker or more sluggish types. In regard to the more resistant species, A. H. Cockayne lays special stress on clovers, cocksfoot, and crested dogstail, but draws attention to the value of twitch, yarrow, and Danthonia pilosa; on the other hand, perennial ryegrass is a poorly-resistant type. It would seem, therefore, that this aspect requires exploring, and offers possibilities of being at least one of the highways along which eventual control will be found.

Another aspect of the problem is that if grass immediately follows cereals, it is recorded that grub infestation is to be expected. The reason for this is most likely as follows:—Ground in which beetles will lay their eggs need not necessarily be in pasture. The females will be attracted to and lay their eggs in soil of a high humus content, and in this the grubs find ample nourishment for their complete development. For example, a common garden practice is to bury cut grass and even straw; this environment is highly attractive to gravid female beetles and offers an excellent breed-

---

DAMAGE BY POTATO MOTH

CONSIDERABLE loss has been experienced by some potato growers in past years through damage by the potato moth. It has been found that if crops are well moulded, thus covering the tubers, the damage is considerably reduced. Other precautions include the speedy picking up of the potatoes at harvesting if the moth is about, and also the sowing of the bags in preference to covering them with potato haulms.

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If you have answered 'Yes' to ANY of these questions, it is quite likely your diet is lacking in the ENERGY vitamin—Vitamin B-1. Local surveys indicate that most people get only two-thirds of the daily requirements of Vitamin B-1 needed for buoyant health. Refined cereals, plus excess sugar and fat in the diet, increase the need for this vitamin, which helps the body to use these foods. If you want to get back that good appetite, healthy digestion, and steady nerves, see that you get your proper share of Vitamin B-1.

Get your supply of B-1 (and other nutritive elements as well) from THESE FOODS: whole grain cereals, wheat germ, wholemeal bread, liver, kidney and other glandular meats; bacon (keep in mind for the future that pork is rich in B-1); milk—fresh or dried, whole or skim; peas—fresh, green, split or dried, beans, lentils, peanuts (when available) and other nuts; oysters; brewery yeast or yeast extracts; potatoes, green and root vegetables (don't use soda when cooking because it destroys Vitamin B-1).

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FOR A HEALTHIER NATION

ing ground for the grass-grubs. Under farming conditions a similar environment is created where a cereal crop has been harvested and the rotting roots of the stubble remain to attract the egg-laying beetles. This suggests another possibility that is worth exploring toward ascertaining what practices should be avoided.

A young turnip crop at Amberley attacked by the "fly."

Seasonal cultivation has some value in checking the grass-grub under certain conditions, but it does not offer a solution to the problem of pasture protection. The insect is very sensitive to disturbance during the pupal state, and ploughing at that time (during September and October) causes a destruction of a high percentage.

Though no comprehensive method is yet known by which farm pastures can be protected from grass-grub invasion, the position in regard to smaller areas is a different matter. Lawns and bowling greens can be "grub-proofed," when the grass is dry, by broadcasting over every 1000 sq. ft. of turf a bushel of screened sand or clean soil with which 5lb. of lead arsenate powder has been thoroughly mixed. The same mixture can be worked into the top soil when a new lawn is being laid down.

Finally, garden plants, being isolated and thus unlike extensive areas of grasses with their dense root masses, can be severely injured by one or two grubs attacking a single plant. Under these conditions some benefit is to be derived by making holes about four inches deep in the soil, near to but not against the plants, pouring in a little carbon bisulphide, and closing up the holes immediately.

Conclusion

The grass-grub is the major insect pest of the country, striking as it does at the pastures of the Dominion upon which our prosperity depends, and no really effective control of the problem as a whole is yet known. A solution of the difficulty will never be found until a sustained and concentrated long-term study is undertaken by a research team of entomologists associated with such others as agronomists and agrostologists. Even then there can be no guarantee that the effort will be crowned by absolute success; but conversely, there remains the obvious guarantee that there never will be a solution without the attempt.

The main objective of the problem is to strike at the grass-grubs in the pastures—to hold them within reasonable bounds, either when they are already in the pastures, or by lessening the chances of the pastures becoming infested. A natural outcome of such an accomplishment would be a corresponding reduction in the depredations of the beetles.

A commencement has been made on this research as a major activity of the entomological service. The problem is a vast one, and no time limit can be placed on it. It entails a study of the life, seasonal, and regional histories of the grass-grub complex in relation to soils, climate, and pasture types and their management; it also necessitates a search for and use of natural enemies and possible insecticides. Whatever the control measures may eventually be, they will be unlikely to centre round one method, but will embrace a combination of methods—perhaps resistant pasture types suited to different soils, pasture management, natural enemies, and possibly insecticides.

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Pedigree Sow Records

Contributed by the Livestock Division.

OF the 8 litters recorded during the period July 1, 1944, to Sept. 30, 1944, there were 4 sufficiently good to be included in one of the five grades set out below:—

Grade.	Litter Weight.	
	At 3 Weeks.	At 8 Weeks.
1	120 lb.	360 lb.
2	100 ,,	300 ,,
3	90 ,,	270 ,,
4	80 ,,	240 ,,
5	70 ,,	210 ,,

Breed Averages

Breed.	No. of Litters Recorded	Litter Weight at		Number of Pigs.		Average Weight at	
		3 weeks. (lb.)	8 weeks. (lb.)	Born.	Weaned.	3 weeks. (lb.)	8 weeks. (lb.)
Tamworth ..	2	63	222	8	6	10.50	37.00
Berkshire ..	3	62.7	271.7	7.66	6.66	9.40	40.75
Large White	2	98	344.5	13	9.5	10.32	36.26

In connection with the grading of litters, a No. 3 grade is looked on as a good performance, No. 2 as excellent, and No. 1 as special.

THE following lists give the names and addresses of the owners, the herd book numbers of the boars and sows, together with the adjusted litter weights at three and eight weeks, the grade of the litter, and the number of pigs born and weaned.

Owner's Name and Address.	Herd Book No. of—		Litter Weight (lb.)		No of Pigs		Grade of Litter
	Sire.	Dam.	3 weeks. (lb.)	8 weeks. (lb.)	Born	Weaned	
Tamworth							
Rangiora High School, Rangiora	12,464	13,462	63	211	10	6	—
Pohangina Pig Club, R.D., Ashhurst	13,305	13,166	63	233	6	6	—
Berkshire							
Pohangina Pig Club, R.D., Ashhurst	19,540	19,024	70	271	8	8	5
P. D. Cook, Matai, Ahaura	18,450	19,557	49	179	7	5	—
Parkvale Pig Club, Park Road, Carterton	19,702	14,880	69	365	8	7	—
Large White							
A. T. Richards, Private Bag, Coast Road, Greymouth ..	5,671	6,001	91	374	12	11	3
A. T. Richards, Private Bag, Coast Road, Greymouth ..	5,671	5,665	105	315	14	8	2
Large Black							
C. L. Morton, Sec. 4, Invercargill-Otara R.D.	3,837	3,845	71	205	8	6	5

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TOPDRESSING

Above: Good farming country in the Warkworth district.

WHEN about the middle of the past century the chemist Liebig first determined the chemical composition of plants and associated their growth with the presence of corresponding elements in the soil he confidently expected that chemical analysis would provide a simple and reliable guide to the requirements of farm soils. Indeed, the relationship between the composition of the plant and that of the parent soil appeared to offer so natural and infallible a basis for determining soil deficiencies that it is not surprising that farmers hailed this new gospel with enthusiasm and believed that their most outstanding difficulty had at last been solved.

By
P. S. SYME,
Instructor in Agriculture,
Warkworth.

IT has been shown that on the average farm soil, the only substances of serious importance likely to be deficient—apart from magnesium and possible trace elements—are limited to four essential elements, nitrogen, phosphate, potash, and lime. As these substances are more or less plentiful in nature and only relatively small quantities are required per acre, it seems reasonable to suppose that if soil analysis could indicate the deficiency, then the chemist could also supply the remedy.

Not So Easy in Practice

Unfortunately, the world's big problems are seldom so easily solved. While, in theory, it would appear logical to base the manurial programme on a scientific soil analysis, this has proved extremely difficult in practice. This is due partly to the relatively minute proportions of nitrogen, phosphate, etc., required, and also to the fact that, while analysis might show that a substance such as phosphate is present in adequate quantity, it may actually be present in such a form that it cannot be assimilated by plants.

Practically every farmer in New Zealand with any length of experience has probably already applied sufficient phosphate to counteract any deficiency on his farm for a period of 50 years ahead or more. Yet experience shows that he must still continue applying phosphate from year to year to maintain his production. Obviously, a chemical analysis of his soil should indicate phosphate in plenty, whereas the acid test of plant growth indisputably points to a phosphate deficiency.

While the farmer owes a debt of gratitude to the chemist for work done in the past, and while he can look forward with confidence to still further help in the future, it seems at present that in determining the requirements of his soil he must enlist the help of additional allies who also can contribute to his knowledge.

Soil Classification

From time immemorial the cultivator has been accustomed to gauge the fertility by the texture and physical appearance of a soil, and indeed it has long been customary to classify soils on this basis. Of recent years, however, the detailed study of soils—as apart from the geological aspect—has led to an entirely new system of soil classification, together with a new science—pedology. Although still in its infancy, this new approach to the old problem offers considerable promise, and there appears to be every hope that, together, the chemist, the pedologist, and the field experimentalist can, in the not distant future, classify and map the long range of soil types along with detailed information regarding their manurial requirements. Indeed, just prior to the outbreak of war, this work was in full progress, and although temporarily interrupted, it is already yielding much valuable information.

In the Warkworth instructorate, comprising Rodney County and portions of the Otamatea and Waitemata Counties, such a survey has been more or less completed, and though the details of the classification are not yet available, it has been found possible to correlate the manurial responses to phosphates, potash, and lime with a number of the prevailing soil types.

Soil Types in Instructorate

With a warm temperature and a generous rainfall there has been a tendency for leaching to occur over a long period of time, and many of the soils show evidence of this in a pronounced form. The fact that much

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of the vegetation, such as the kauri, was of an inefficient type, tending to form an acid humus covering, has further emphasised the leaching effect of the high rainfall, so that soil types show a wide degree of variation, ranging from the immature to the semi-mature, sub-mature, and mature podsol. Even though many of the soils overlie limestone formations, there is a general and widespread deficiency of lime, while phosphate also is markedly deficient. In the search for gum considerable areas were repeatedly burned off, resulting in the destruction of the natural humus covering, and many soils on this account are apt to be lacking in humus and nitrogen. For the most part the prevailing soil types are of a heavy texture and range from clay loams to almost pure clays, and potash deficiency is rather unusual.

Although it is common for farms in the instructorate to be composed of a patchwork of different soil patterns, these consist as a rule of varying phases of a few distinct and recognised soil types. The following descriptions cover the prevailing soils:—

Generous topdressing with lime and phosphate is the basis of prosperity over most of the district.

1. Immature Podsol.—This is the most widely-distributed soil type, and consists of a brown-coloured clay derived from mudstones and sandstones. This type is easily distinguished by its uniform brown colouring, which extends from the surface to a considerable depth. Manurial trials carried out have shown high lime and phosphate deficiencies, but so far little response has yet been obtained to applications of potash. The response to lime has been found somewhat variable, and the initial application of lime needed to build up a first-class pasture has varied from about 15cwt. per acre to about 2 tons.

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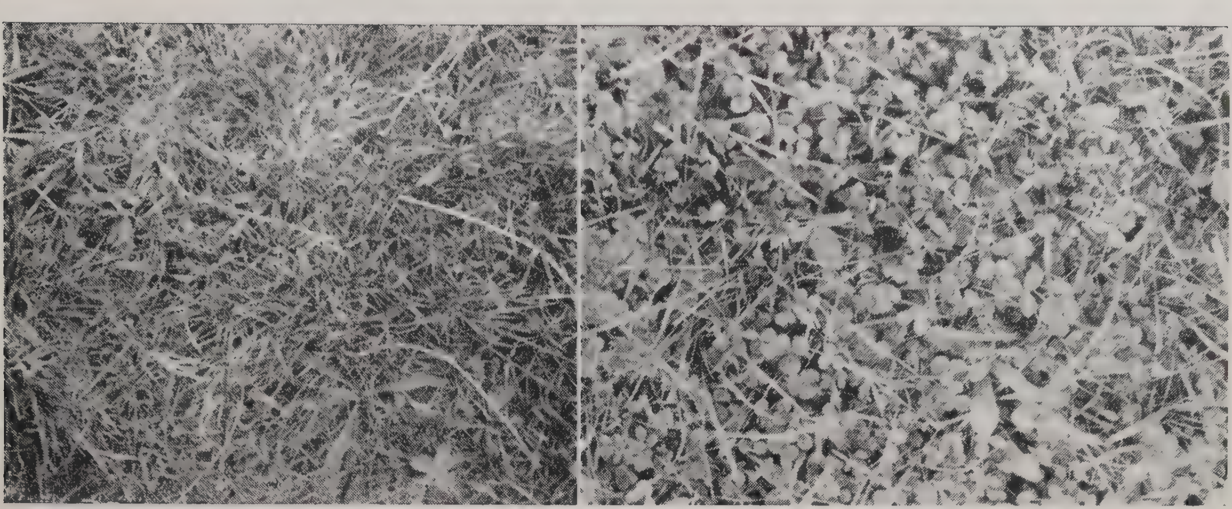

Lime and phosphate changed this . . . . into this.

2. Semi-mature Podsol.—This consists of a light-coloured greyish-brown clay overlying a light-coloured grey subsoil, and though fairly widely distributed, it is rather less extensive than No. 1. This type also has been further affected by leaching, and is regarded as being semi-mature. It is deficient in lime and phosphate and may possibly sometimes be deficient in potash. Experimental work suggests, however, that this deficiency may be uncommon, and farmers would be well advised to try out potash on a small scale before making extensive purchases.

3. Semi- to Sub-mature Podsol.—This soil type is rather more extensive than type 2, and embraces a wide range of territory from Mangawai down towards Wellsford, as well as most of the area enclosed between Albany, Kumeu, Helensville, and Orewa. The soil is more leached than either of the two previous ones and is of a heavy clay texture, generally white to grey in colour, with patches of grey silt or sandy loam. It is regarded as being an older and more mature form of type 2. Like the types previously mentioned, it is deficient in both phosphates and lime, and this despite the fact that considerable areas overlie limestone formations. Where the area has been in grass for a period of years potash may sometimes be used to advantage.

4. Rendzina Soils.—Unlike the soils already mentioned, which are derived from mudstone and sandstone formations ,this type has been originally derived from limestone. Such soils are of a heavy texture, generally dark on the surface, ranging to a light grey colour and overlying a limestone formation. Being originally rich in lime, the effect of leaching has been less pronounced in this group. Natural fertility is relatively high, but a good response is obtained from phosphate, and lime also may sometimes be used to advantage. This type is more limited in area than those previously mentioned, and occurs chiefly in the Maungaturoto, Port Albert, and Wellsford districts.

Apart from the soil types already described, which are characteristically heavy in texture, there are two types of immature sandy soil. The first of these, a deep sandy loam, extends from South Head down towards the end of the Kaipara Harbour. The natural fertility of much of this area is fairly high, and good pastures have been built up with the use of phosphates alone. This soil merges into a somewhat similar soil of sandy loam resting on a clay subsoil, which extends down towards Muriwai. This soil is lacking in phosphate and also responds to dressings of lime.

In addition to these main soil types there are also a number of soils of alluvial origin in the river valleys. These are, however, of a more local nature. Responses tend to depend on the age of the soil, but in general they respond to lime and phosphates. There are also some restricted areas of dark, peaty, sandy soil, generally located along the east coast. The responses are rather variable, but responses have been obtained to phosphates and on some to lime and potash.

In the pre-war years there was much diversity of opinion concerning the most efficient fertiliser for the different soils throughout the instructorate, though there was also much unanimity regarding the value of such well-tried fertilisers as basic slag,

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superphosphate (with lime), and North African phosphate. While the relative efficiency of these may admittedly vary according to the soil type, available evidence goes to show that regular generous topdressing over a period of years will build up a first-class pasture almost irrespective of the form in which the phosphate is applied.

It has commonly been noted that whereas basic slag, North African phosphate, and serpentine super without lime may still give an appreciable response, the application of straight super, on the other hand, without adequate liming, appears to be more uneconomic. On well-limed soil, however, superphosphate has generally proved its worth and has merited its popularity.

As already mentioned, potash is not commonly deficient, but where it has been lacking the response to an application has proved quite spectacular. It is interesting to note that on a trial on a new pasture on the farm of Mr. R. Nicholls, Dairy Flat (semi- to submature podsol), no response was detected till about five years after the commencement of the trial. From then onwards, however, the response due to the potash was unbelievably good. Presumably, sufficient potash was naturally present after the grassing to provide for about five years' growth. This delayed response indicates the need to avoid premature conclusions, and explains why the work of classifying responses must of necessity be slow.

Conclusions

The prevailing soil types generally respond well to phosphates. All of the well-known phosphatic fertilisers, such as basic slag, superphosphate (with lime), serpentine super, North African phosphate, etc., have given good results, and any preference may sometimes be largely a matter of opinion.

Most of the main soil types respond well to lime, and in fact the best results from topdressing cannot be expected until the land has been well limed. The amount of lime required may range from an initial dressing of from 15cwt. to 2 tons or more, followed by an annual dressing of, say, 5cwt. each year or 10cwt. each second year.

Potash is not commonly deficient, but it may be required on some of the older soil types, or where the soil is silty or is of a light texture. As a rule, extensive purchases are not warranted until an application has been tried out on a small scale.

In view of the complex assortment of soil types, farmers would be well advised to use strip manurial treatments or small trials wherever there is doubt concerning the manurial requirements of the soil. Apart from variation in soil types, it should be remembered that soils are by no means stable, and a continuous high output of produce over a period of years may well lead to new deficiencies, resulting in lowered fertility and entailing the need for a revision of the topdressing programme.

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NEW BACON-JUDGING STANDARDS

THE method used during the past 18 months for judging baconer carcasses at competitions was described in an article in the July issue of the "Journal of Agriculture." This method, while giving general satisfaction to both judges and competitors alike, was to be subject to certain revisions after an investigation of the results of previous competitions had been made by the under-mentioned committee set up by the Department of Agriculture, which would make the new standards acceptable to all interested parties. The new standards have now been finalised and tried out at competitions recently held at Feilding, Horotiu, and Moerewa, involving the judging of 2,000 baconer carcasses.

THE report as presented for the approval of both the National Pig Industry Council and the New Zealand Pig-breeders' Association, and accepted by them, is given hereunder in detail, and will be the method adopted for all future baconer competitions held in New Zealand.

REPORT OF TECHNICAL COMMITTEE SET UP BY THE DEPARTMENT OF AGRICULTURE.

Members of the committee were:—Messrs. C. P. McMeekan, Superintendent, Ruakura Animal Research Station, Department of Agriculture; H. M. Peirson, Superintendent, Pig Industry, Department of Agriculture; H. E. Johnson, representing Pig Breeders' Association; H. Kneebone, Supervising Grader for Auckland Farmers' Freezing Co.; F. Merrit, Supervising Grader, Meat Board, Auckland; J. D. Anderson, Supervising Grader, W. and R. Fletcher Ltd., Westfield, Auckland.

During the past 10 years enthusiasts interested in the improvement of the New Zealand bacon pig have developed various systems of judging baconers. Commencing with a simple method of eye-judgment, in which bacon-curers and others associated with the trade merely selected the best-looking carcasses as prize-winners, more and more reliance upon direct measurements of particular characters has gradually replaced guesswork. Such direct measurements were a decided advantage over eye-judgments in that they eliminated the personal factor and, in addition, provided definite standards at which the breeder of pigs could aim and by which he could measure his progress from year to year.

This application of direct measurements to the evaluation of a bacon-pig carcass culminated in the development of the so-called "Smithfield System" of judging, provided by the well-known British authorities, Messrs. J. B. S. Swain, of Empire Port House; H. R. Davidson, of Harpendon, Hert.; Dr. John Hammond, of Cambridge University; and Mr. N. L. Wright, of the New Zealand Department of Scientifice and Industrial Research, London(1). This system was evolved over a period of years in direct response to requests from New Zealand producers for standards which would enable them to assess accurately the suitability of their pigs for British trade requirements. The Smithfield system depended almost entirely on careful measurements of back-fat, length, leg-length, and muscle-development. It involved cutting he carcass in the loin region to enable its internal composition to be measured. The system set a high standard of excellence, the average New Zealand pig scoring only about 50 per cent. of the possible marks. Due partly to this severity in judgment, but more to the fact that cutting the carcass involved a financial loss which it has not been possible for interested organisations to meet on every occasion, the system has been used only to a limited degree. Only in one or two areas where suitable arrangements for cutting have been possible has it been in continuous use. In other districts judges have been forced to improvise modifications of a type involving no serious disturbance to normal trade practices. In these, cutting of the carcass has been dropped and measurement of eye-muscle, and fat over the eye, eliminated. More reliance has had to be placed on eye-judgment.

As one such modification, the National Pig Industry Council has used a system designed to bring judging results into line with commercial grading of bacon pigs. Measurements that could be obtained readily were retained, but even here standards asked for were suitably lowered in comparison with the Smithfield scale. This system raised the average mark of competition pigs to somewhere near the 80 per cent. level, and thus gave a good comparison with commercial grading under which about 80 per cent. of pigs grade No. 1 Prime. While achieving this objective it was soon found subject to the very severe criticism that it did not give sufficient scope in judgment to allow full credit to the really superior carcass or sufficient penalty to the really inferior pig.

Difficulties of this type soon focused attention on the point that it is not practicable to employ the same methods both for judging pigs in competition work and for commercial grading. In commercial grading a system is needed that will sort out three or four reasonably uniform lines of commercial carcasses. In such lines there can, and will, be a good deal of variation in type, but, on the average, the carcasses of any particular grade will be suitable for the purposes intended. On the other hand, in judging pigs as individuals a system is needed that will sort out carcasses in order of individual merit. To do this it is essential that a wide range of marks be both available and used. For example, in the National Council method as used in recent competitions full marks for back-fat were awarded to any pig that graded No. 1 Prime. Since a large tolerance in back-fat measurements is allowed under the commercial grading system, this meant that pigs with ideal fat received the same mark as others that were much fatter or leaner. No separation of pigs in order of merit was possible. This naturally led to considerable confusion on the part of exhibitors and farmers viewing the prize-winning entries. Since all of these systems have been used in different districts of recent years, it is obvious that there has been no uniformity in judging. To secure such uniformity the Department of Agriculture recently set up a technical committee composed of the writers of this report. Having wide practical experience in trade requirements and carcass evaluation work, and representing all interested parties, it was hoped that this committee could evolve a system which would be accepted throughout New Zealand.

In approaching the problem the committee had in mind the following essential requirements:—

1. That measurements should be employed wherever practicable.
2. That, where eye-judgment is unavoidable, photographic standards should be used as a guide to judges.
3. That the system should be so balanced that no one character should outweigh another, but rather that an all-over good type animals should be sorted out.
4. That, to be workable, the method should not conflict with established trade practices of processing and marketing.

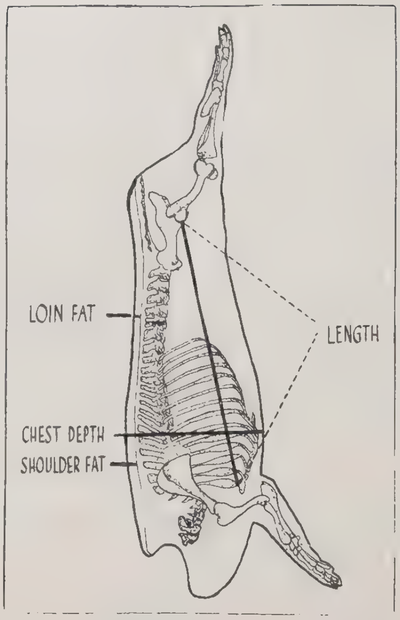

Fig. 1.—Method of measuring length, chest depth, shoulder-fat, and loin-fat.

In evolving the system hereafter described the committee has taken advantage of the data available from many carcass competitions of past years, and has tried out tentative methods in recent competitions involving over four thousand pigs. It is satisfied that, in the hands of experienced judges, the system provides an accurate measure of the excellence of a bacon carcass, and will sort out the type of carcass required by the Wiltshire bacon trade both in New Zealand and overseas.

Method of Pointing

A maximum of 100 points is allotted each pig. These are based upon 60 points obtained from direct measurements and 40 points obtained from

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eye-judgment. The distribution of the points is as follows:—

Direct Measurement—	Maximum Points.
Length	20
Shoulder-fat	10
Loin-fat	20
Balance and depth ..	10
Eye-judgment—	
Hams	15
Fore end (shoulders) ..	10
Fullness of meat	10
Marketing points	5
Total	100

Disqualifications.—In view of the impossibility of making fair allowance for disease and other important defects, the following characters automatically disqualify an entry from being placed in any competition, but will not necessarily prevent such an entry being evaluated under the system: **extensive seedy cut; excessively soft or discoloured fat; pigs rejected or condemned in part or whole by normal grading practice.**

It will be observed that headless pigs and pigs rejected for export on account of pleurisy are thus disqualified.

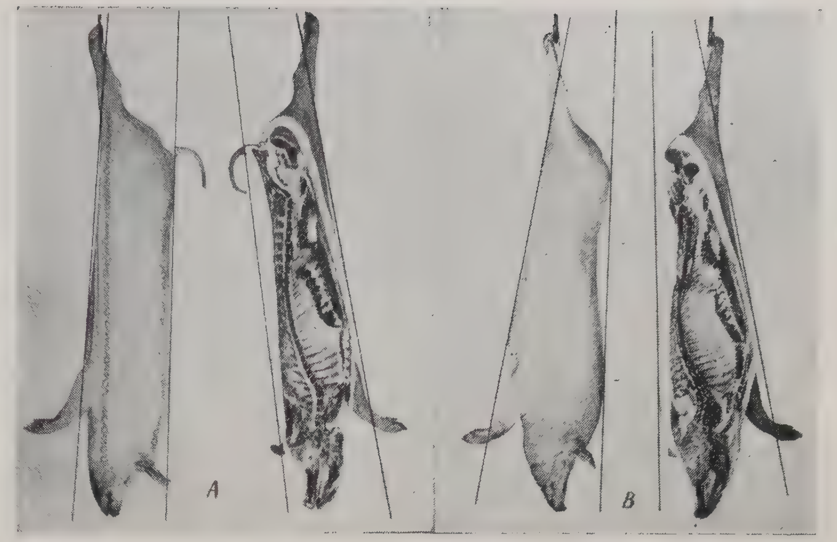

Fig. 2.—Balance of side: A, good balance; B, bad balance.

Weight Range

The system applies with accuracy only to pigs of optimum bacon weight —to pigs from 130lb. to 160lb. dressed weight. It is strongly recommended that competitions be limited to pigs within this weight range. To enable pigs outside this range to be evaluated where necessary, the following tables include measurements for lighter and heavier weights. It must be stressed, however, that pigs lighter than 130lb. will score better than they should. Heavy-weight pigs, since these are undesirable under normal conditions, will tend to be penalised. Within the true bacon-weight range the system gives an even chance to a pig to score well, irrespective of its weight.

Length (20pts.)

Length is measured to the nearest ¼in. in a direct line from the aitch-bone (symphysis-pubis) to the junction between the first rib and the sternum (see Fig. 1). The standard required is comparable with that of the Smithfield system, and, as a general guide, a length of 32¼in. for a pig of 141lb. to 145lb. is demanded for maximum points. For each ¼in. below this standard 1 point is deducted. Actual points for length in relation to weight are shown in Table 1.

Table 1.—Scale of Points for Length
(Length in inches and quarter inches)

Points.	Light Weight.		Carcass Weight (Lb.).						Heavy Weight.	
	121–125.	126–130.	131–135.	136–140.	141–145.	146–150.	151–155.	156–160.	161–165.	166–170.
1 ..	26^{2}	26^{3}	27^{0}	27^{1}	27^{2}	27^{3}	28^{0}	28^{1}	28^{2}	28^{3}
2 ..	26^{3}	27^{0}	27^{1}	27^{2}	27^{3}	28^{0}	28^{1}	28^{2}	28^{3}	29^{0}
3 ..	27^{0}	27^{1}	27^{2}	27^{3}	28^{0}	28^{1}	28^{2}	28^{3}	29^{0}	29^{1}
4 ..	27^{1}	27^{2}	27^{3}	28^{0}	28^{1}	28^{2}	28^{3}	29^{0}	29^{1}	29^{2}
5 ..	27^{2}	27^{3}	28^{0}	28^{1}	28^{2}	28^{3}	29^{0}	29^{1}	29^{2}	29^{3}
6 ..	27^{3}	28^{0}	28^{1}	28^{2}	28^{3}	29^{0}	29^{1}	29^{2}	29^{3}	30^{0}
7 ..	28^{0}	28^{1}	28^{2}	28^{3}	29^{0}	29^{1}	29^{2}	29^{3}	30^{0}	30^{1}
8 ..	28^{1}	28^{2}	28^{3}	29^{0}	29^{1}	29^{2}	29^{3}	30^{0}	30^{1}	30^{2}
9 ..	28^{2}	28^{3}	29^{0}	29^{1}	29^{2}	29^{3}	30^{0}	30^{1}	30^{2}	30^{3}
10 ..	28^{3}	29^{0}	29^{1}	29^{2}	29^{3}	30^{0}	30^{1}	30^{2}	30^{3}	31^{0}
11 ..	29^{0}	29^{1}	29^{2}	29^{3}	30^{0}	30^{1}	30^{2}	30^{3}	31^{0}	31^{1}
12 ..	29^{1}	29^{2}	29^{3}	30^{0}	30^{1}	30^{2}	30^{3}	31^{0}	31^{1}	31^{2}
13 ..	29^{2}	29^{3}	30^{0}	30^{1}	30^{2}	30^{3}	31^{0}	31^{1}	31^{2}	31^{3}
14 ..	29^{3}	30^{0}	30^{1}	30^{2}	30^{3}	31^{0}	31^{1}	31^{2}	31^{3}	32^{0}
15 ..	30^{0}	30^{1}	30^{2}	30^{3}	31^{0}	31^{1}	31^{2}	31^{3}	32^{0}	32^{1}
16 ..	30^{1}	30^{2}	30^{3}	31^{0}	31^{1}	31^{2}	31^{3}	32^{0}	32^{1}	32^{2}
17 ..	30^{2}	30^{3}	31^{0}	31^{1}	31^{2}	31^{3}	32^{0}	32^{1}	32^{2}	32^{3}
18 ..	30^{3}	31^{0}	31^{1}	31^{2}	31^{3}	32^{0}	32^{1}	32^{2}	32^{3}	33^{0}
19 ..	31^{0}	31^{1}	31^{2}	31^{3}	32^{0}	32^{1}	32^{2}	32^{3}	33^{0}	33^{1}
20 ..	31^{1}	31^{2}	31^{3}	32^{0}	32^{1}	32^{2}	32^{3}	33^{0}	33^{1}	33^{2}

Length taken as in Fig. 1 to nearest quarter-inch above.

Shoulder-fat (10pts.)
Loin-fat (20pts.)

Shoulder-fat is measured to the nearest $^{1}/_{16}$in. at right angles to the skin at a point opposite the third vertebra. Loin fat is measured to the nearest $^{1}/_{16}$in. at right angles to the skin at the smallest depth in the region opposite the kidney (see Fig. 1). For convenience both these measurements include the thickness of skin, for which due allowance has been made in the tables. As a guide to the standard asked for, maximum points are awarded for shoulder-fat where this is between $^{22}/_{16}$in. and $^{25}/_{16}$in. in a pig 141lb. to 150lb. Thus a small tolerance in fat-measurements at the shoulder is permitted for maximum points. At the loin the standard for a pig of the same weight is $^{14}/_{16}$in., with no tolerance. Since the trade demands an **optimum** amount of fat, deductions are made (see Tables 2 and 3) for both increases and decreases in fat-measurements above and below these standards.

Balance and Depth of Side (10pts.)

In view of the importance of this character in a bacon pig (see Fig. 2), attention has been given to the best way of measuring it. A good side is one which is not only well balanced in its proportions, but also one which is not too deep through the fore end. The method used hitherto has been to take the difference between the maximum depth through the chest and the depth through the flank. The smaller the difference, the greater the number of points awarded. This has not proved satisfactory, since short, excessively deep pigs often scored full marks. A little thought emphasises that the depth of side should be considered in relation to its length. Accordingly, in the system here adopted, the carcass is measured through the deepest part of the chest to the nearest ⅛in. (see Fig. 1), and points awarded according to the ratio of this measurement to the length of the same carcass.

For maximum points the chest depth must not be more than 40 per cent. of the length. Thus a pig with a length of 30in. from aitch-bone to first rib will secure full points for balance and depth if it has a chest depth of 12in. or less. An increase of ¼in. above this standard results in a loss of 1 point (see Table 4). This standard is based upon the relationship between length and depth in the best-quality Danish Wiltshire sides(2).

To avoid the danger of breeding pigs that are too shallow in chest depth a penalty of 5 points is deducted from the score for this character in the case of pigs that are 1in. or more below the minimum chest depth standard for full points.

TABLE 2.—SCALE OF POINTS FOR SHOULDER-FAT

(Measurements, in sixteenths-inches, to include skin depth)

Points.	Weight (Lb.).				
	121–130.	131–140.	141–150.	151–160.	161–170.
1	33	34	35	36	37
2	32	33	34	35	36
3	31	32	33	34	35
4	30	31	32	33	34
5	29	30	31	32	33
6	28	29	30	31	32
7	27	28	29	30	31
7	26	27	28	29	30
8	25	26	27	28	29
9	24	25	26	27	28
10	23	24	25	26	27
10	22	23	24	25	26
10	21	22	23	24	25
10	20	21	22	23	24
9	19	20	21	22	23
8	18	19	20	21	22
7	17	18	19	20	21
7	16	17	18	19	20
6	15	16	17	18	19
5	14	15	16	17	18
4	13	14	15	16	17
3	12	13	14	15	16
2	11	12	13	14	15
1	10	11	12	13	14

TABLE 3.—SCALE OF POINTS FOR LOIN-FAT

(Measurements, in sixteenths-inches, to include skin depth)

Points.	Weight (Lb.).				
	121–130.	131–140.	141–150.	151–160.	161–170.
6	5	6	7	8	9
9	6	7	8	9	10
12	7	8	9	10	11
14	8	9	10	11	12
16	9	10	11	12	13
18	10	11	12	13	14
19	11	12	13	14	15
20	12	13	14	15	16
18	13	14	15	16	17
16	14	15	16	17	18
12	15	16	17	18	19
9	16	17	18	19	20
6	17	18	19	20	21
4	18	19	20	21	22
2	19	20	21	22	23

Hams (15pts.)

To aid judges in securing uniformity in awarding points for hams, photographic standards have been prepared (see Fig. 3).

The most important point is width through the thighs at the tail level when viewed from the back and depth when viewed from the side. The ham should also be well filled in the crutch, with short legs, carrying a maximum of fleshing down toward the hock.

It is extremely important that this deep fleshing over the pelvis should consist of muscle rather than fat. Many hams have an ideal shape in being even wider, deeper, and better filled than that illustrated as being worthy of full points (Fig. 3), but are undesirable because these qualities come from excessive fat. Such hams must be penalised according to their degree of fatness.

It is also extremely important in this, as in all other eye-judgment characters, to make full use of the scale of points available. Most judges have a tendency to give neither very high nor very low points, with the result that fair allowance for ham quality is not made.

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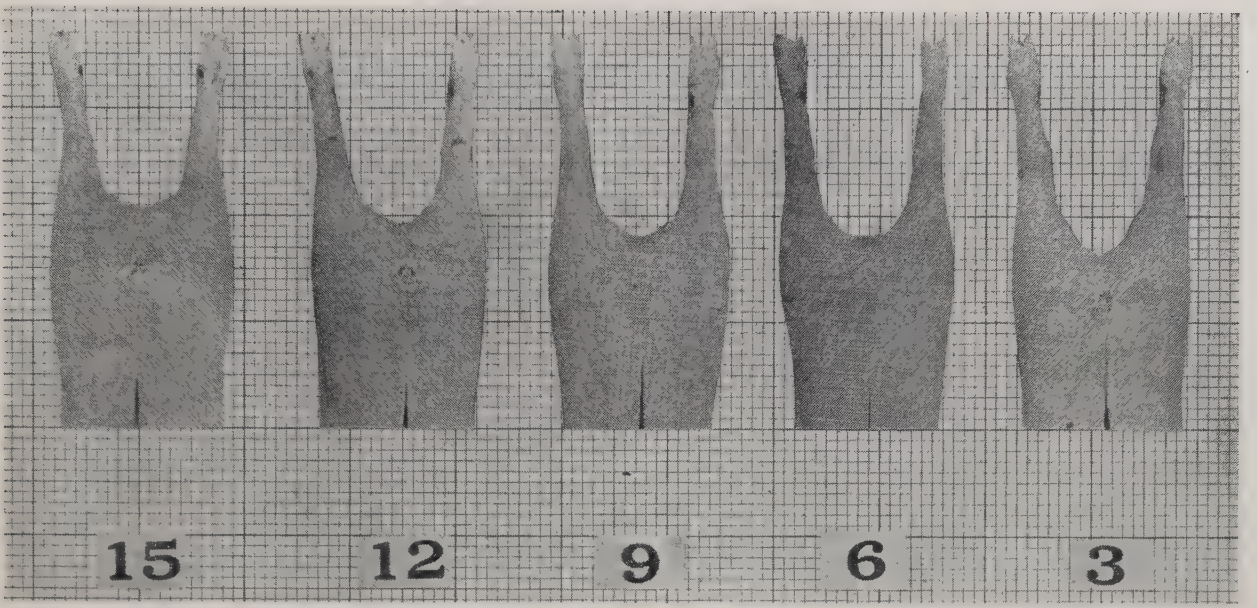

Fig. 3.—Photographic standards for judging hams.

Fore End (Shoulders) (10pts.)

Here again photographic standards have been provided to assist judges (Figs. 4, 5, and 6).

The principle that the fore end should account for the smallest possible weight of the whole carcass should dominate award of points. In general, this principle is fulfilled with a shoulder that is narrower across the back than the corresponding measurement through the hams; a shoulder that is neatly tapering rather than bulging, and a shoulder that is not too deep when viewed from the side. A slight bulge in the position of the shoulder-blade is not a defect if this is due to muscle rather than fat. This can usually be assessed by the depth of back muscle exposed by the backing down over the shoulder region. Head and jowl should be light. The side view (Fig. 5) is most important in assessing the relative weight of carcass in front and behind the shoulder-blade.

It must be emphasised that the shoulder can be too fine or sharp over the withers. Such excessive fineness is associated with lack of depth in fleshing throughout the carcass.

The same remarks about using the full scale of points in eye-judgments apply to judging the fore end.

Fullness of Meat (10pts.)

In awarding points for fullness of meat, points are given for the wealth of muscle against fat. A reasonable proportion of fat is essential in all meat, but the average consumer insists on a much greater percentage of muscle than fat. In addition, he prefers a deep layer of muscle over the bone.

The committee appreciates that the only accurate measure of muscle depth is one obtained from cutting the carcass. Since this is not practicable an attempt to assess it by eye must be made. Because any such assessment can be no more than an educated guess, fewer points are awarded for this character than under the Smithfield system, where the actual depth of eye-muscle on the loin cut was used as a basis.

Since the loin region is the weakest part of a pig, the development in this part is taken as a guide. Fullness of meat is judged according to the fullness of loin, taking into account the thickness of fat-cover. From careful comparisons of uncut and cut loins it is considered that the depth of muscle will be satisfactory providing the loin region is well developed and providing this development is not made up mostly of fat. Evenness of fat-cover is essential. The depth of fat may be correct in the back line over the loin but may thicken very quickly a few inches down the side. Such a loin appears very well "filled" to the inex-

Table 4.—Scale of Points for Balance and Depth of Side
(In eighth-inches)

Points.	Length, in Inches.							
	26.	27.	28.	29.	29.	30.	31.	32.
1	12^{6}	13^{1}	13^{4}	13^{7}	14^{2}	14^{5}	15	15^{3}
2	12^{4}	12^{7}	13^{2}	13^{5}	14	14^{3}	14^{6}	15^{1}
3	12^{2}	12^{5}	13	13^{3}	13^{6}	14^{1}	14^{4}	14^{7}
4	12	12^{3}	12^{6}	13^{1}	13^{4}	13^{7}	14^{2}	14^{5}
5	11^{6}	12^{1}	12^{4}	12^{7}	13^{2}	13^{5}	14	14^{3}
6	11^{4}	11^{7}	12^{2}	12^{5}	13	13^{3}	13^{6}	14^{1}
7	11^{2}	11^{5}	12	12^{3}	12^{6}	13^{1}	13^{4}	13^{7}
8	11	11^{3}	11^{6}	12^{1}	12^{4}	12^{7}	13^{2}	13^{5}
9	10^{6}	11^{1}	11^{4}	11^{7}	12^{2}	12^{5}	13	13^{3}
10	10^{4}	10^{7}	11^{2}	11^{5}	12	12^{3}	12^{6}	13^{1}

Note.—½ in. or over in length is to be counted as nearest inch above—*i.e.*, 28½ in. = 29 in. Depth to nearest eighth-inch above.

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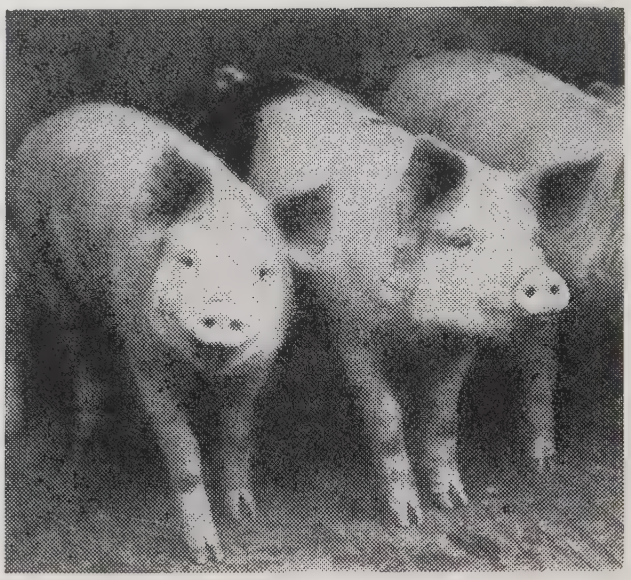

Take a look at these pigs. They are part of a line, test fed on Tomoana Fortified Meal by Mr. W. H. Lewis Morgan of Pukekohe East. The test was carried out under the supervision of Mr. H. E. Clark, Auckland District Pig Council Supervisor.

Here are the figures:—

NO. 1 PEN OF 6 PIGS was fed on the following:—

Tomoana No. 1 Meat Meal	1lb. per pig per day
Barley	½lb. per pig per day
Tallow	1lb. per pig per day

Swedes to appetite.

NO. 1 PEN—STRAIGHT MEAT MEAL.

	Date of Weighing	1	2	3	4	5	6	Total
1	3.4.43	40	63	48	62	60	48	321
2	17.4.43	47	69	54	67	69	54	360
3	3.5.43	59	77	66	79	94	75	450
4	15.5.43	63	84	74	83	105	82	492
5	4.6.43	79	105	90	105	121	97	617
6	17.6.43	81	116	91	111	129	106	634

NO. 2 PEN OF 6 PIGS was fed on the following:—

Tomoana Fortified Meal . ..	1lb. per pig per day
Barley	½lb. per pig per day
Tallow	1lb. per pig per day

Swedes to appetite.

NO 2 PEN—FORTIFIED MEAL.

1	3.4.43	70	58	50	35	68	40	321
2	17.4.43	92	79	70	44	84	46	415
3	3.5.43	106	98	70	52	100	58	484
4	15.5.43	120	113	90	62	107	65	559
5	4.6.43	142	132	109	79	129	82	673
6	17.6.43	152	148	116	85	142	86	729

EXTRA WEIGHT OF SIX "FORTIFIED" FED PIGS			**95lbs.**
95lbs. live weight equals (approx.) 64lbs. dead weight at 7¾d. lb. equals	**£2**	**1**	**4**
450lbs. of each Meat Meal was used, and, since "Fortified" cost £2 per ton more, the extra cost of feeding "Fortified" was		**10**	**0**
ACTUAL CASH GAIN WITH FORTIFIED MEAL	**£1**	**11**	**4**

PUKEKOHE EAST,
12th October, 1943.

Messrs. W. & R. Fletcher (N.Z.), Ltd.,
Auckland.

Dear Sirs,

When you placed Tomoana Fortified Meal on the market I decided to carry out a feed trial, comparing it with Meat Meal. I might mention that I have carried out several pig feeding trials with various foods and mixtures during the last few years, and this was one that certainly showed good results. With two pens of six pigs (each pen weighing the same) the live weight gain during sixty days was 95lbs. more for the Fortified Meal fed pen than the Meat Meal pen. The extra cost of the Fortified Meal over the Meat Meal was about ten shillings for the amount consumed, but the net gain for the six pigs amounted to £1/7/4* This trial was carried out during the winter when there was practically no milk available, but other foods used were grain meals and swedes to appetite. In my opinion Fortified Meal is going to be a very valuable supplementary food for winter feeding.

Yours faithfully,

W. H. LEWIS MORGAN.

* (With 1944 prices profit is now £1/11/4).

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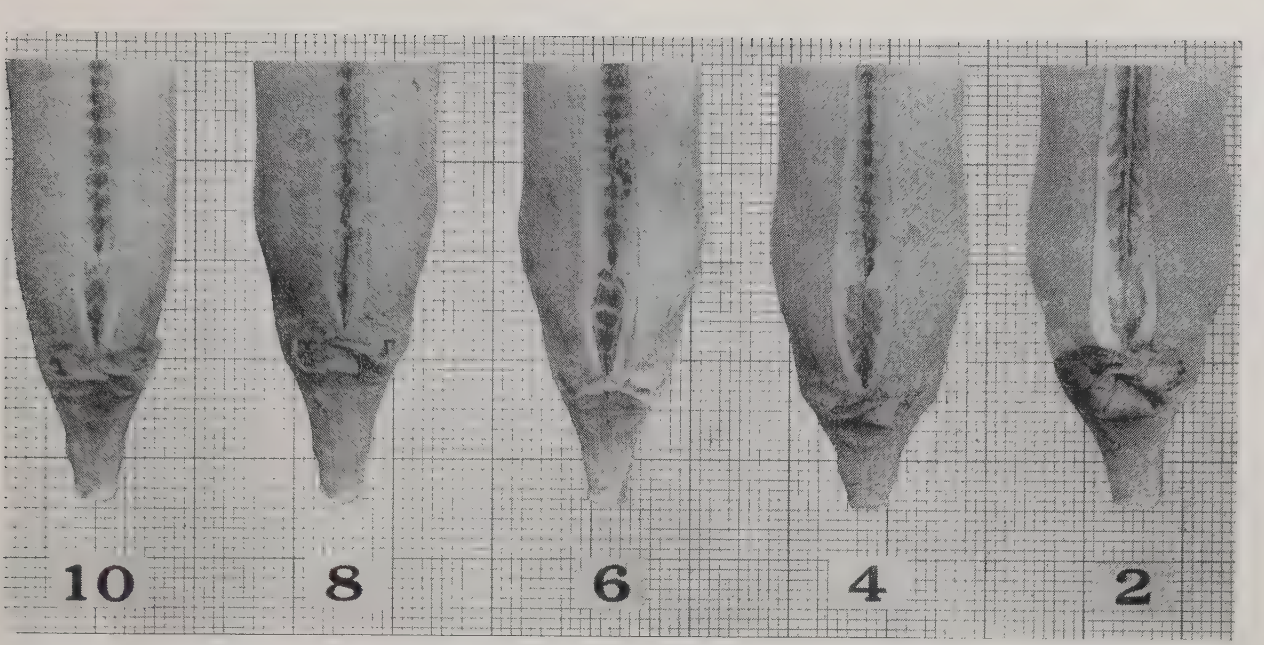

Fig. 4.—Photographic standards for judging fore end.

perienced judge. This is not so. The correct type of loin is flat and wide on the back, with the sides almost square with the back and not round like a barrel. This generally gives a definitely "feminine waist" to a pig to a degree which amounts to weakness according to traditional standards (see the good pig of Fig. 7).

A secondary guide which must also be taken into account is the thickness of belly in the loin region. The greater the thickness, providing again that this is not due mainly to fat, the greater the points awarded.

Experience on the part of judges is more essential in judging fullness of meat than in any other character.

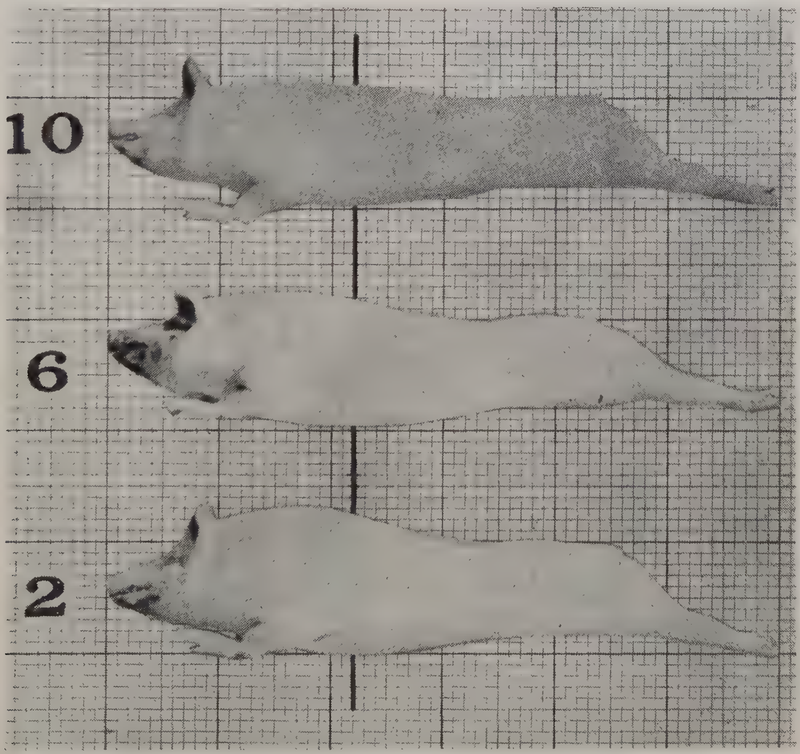

Fig. 5.—Further photographic standards for judging fore end.

Marketing Points (5pts.)

This allowance is made to take into account those characters important to the trade which have not been included above.

Under this head are considered texture and colour of skin, freedom from hair, bruises, and blemishes, and suitability of weight.

Texture and Colour of Skin.—The skin must be thin and fine in texture. It must also be uniformly light in colour. Deviations from these requirements are penalised by loss of points.

Freedom from Hair, Bruises, and Blemishes.—These are self-explanatory, with the proviso that no penalty is made for bruises or abrasions which, in the opinion of the judges, have been incurred in transit.

Weight Suitability.—In view of the recommendation already made to confine carcass competitions to pigs of true bacon weight, and to ensure that pigs below 130lb. do not gain an advantage if they have to be included, penalties are made for unsuitability of weight. The judge should exercise his discretion here and make whatever deduction, up to the full value of 5 points, that is necessary to exclude such a pig from a high rating.

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Judging of Groups of Pigs

The foregoing system is designed to apply to the evaluation of a single pig. For many reasons, different organisations are interested in competitions involving more than one pig per entry, and are faced with the problem of adapting a judging system to a group of pigs.

The committee is of the opinion that any special additions to the method so far outlined, to suit such competitions, are the responsibility of the organisation involved and should be decided on a basis of the particular objectives of the competition concerned.

As a general guide, however, the committee, based on its experience of such group competitions, makes the following recommendations:—

1. That the individual pigs be judged as above, and the total score of the group obtained and used as the basis of award:
2. That, in addition to individual quality, allowance be made for uniformity of both weight and type on a group basis:
3. Uniformity of weight (10 points) should be allowed for according to the difference in weight between the lightest and heaviest member of the group, as follows:—

Weight Range.	**Per Group.**
10lb. or less	**10 points**
14lb.	**8 points**
18lb.	**6 points**
22lb.	**4 points**
26lb.	**2 points**

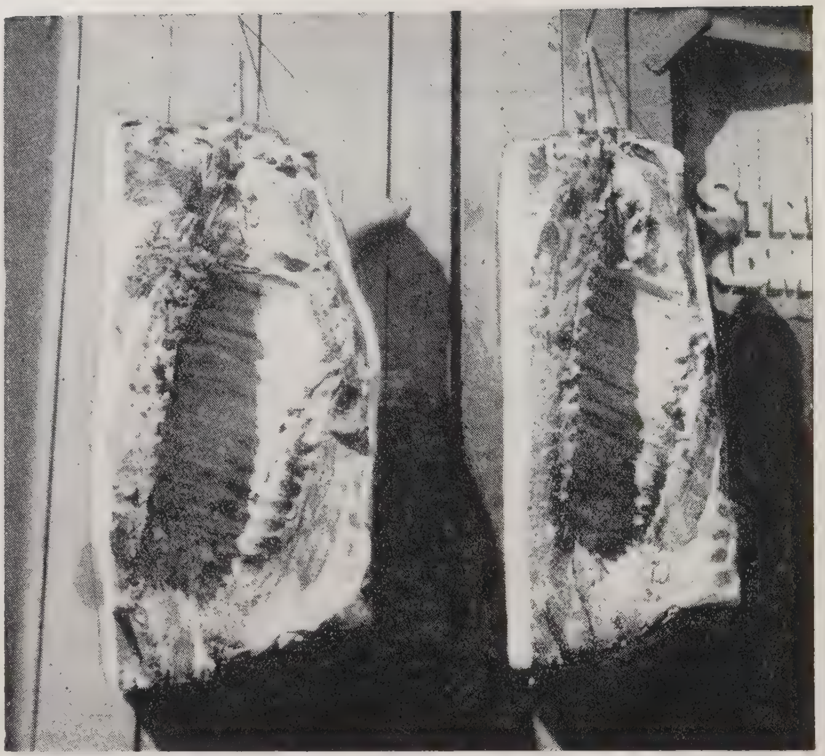

Fig. 6.—Examples of good and bad balance in the cured side.

This scale can apply irrespective of the number of pigs in the group:

4. Uniformity of type should be allowed for on a basis of 10 points per group for evenness of conformation as judged by eye. Thus the group of Fig. 8 would secure 9 points, losing 1 point for the short carcass. The total points here might well be reduced to 5 for groups involving less than four pigs.
5. Disqualification of one pig in a group should automatically disqualify the whole group.

Acknowledgments

The thanks of the committee are due to the Department of Agriculture, Messrs. W. and R. Fletcher and Co., Ltd., and the Auckland Farmers' Freezing Co., Ltd., without whose cooperation the investigation on which this report is based would not have been possible. We also appreciate the action of the National Pig Industry Council and the New Zealand Pig Breeders' Association in accepting the system as the official standard judging system for bacon pigs.

REFERENCES.

(1) Davidson, H. R., *et al.* (1936): *Pig Breeders Ann., 16,* 49-69.

(2) McMeekan, C. P. (1939): *J. Agr. Sci., 29,* 116-124.

PURPOSE OF BACONER COMPETITIONS.

The establishment of official standards for judging baconer carcasses not only gives the producer in attendance at competitions an understanding of the methods used to evaluate his pigs,

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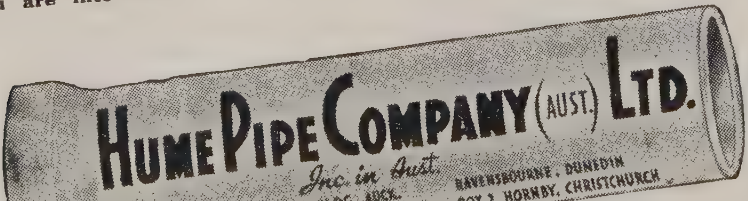
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but provides him with an opportunity of making a critical study of all the practices in use at the freezing works.

This study extends to the possible happenings to pigs in transit from farm to works. It intensifies the necessity of such marketing factors as suitabilty of weight and evenness of conformation of the pigs. It results in the pooling of information and knowledge of the pig industry for the benefit of all, and brings into effective co-operation producers, export freezing works, curers, meat inspectors, buyers, and agents who are, after all, vitally concerned with the consumers' demands. Consumers' tastes dictate the standard for any product.

When the consumer and the producer meet the desire of the consumer is fairly readily interpreted. It is seldom, however, that the pig-producer comes into contact with the consumer, in order to ascertain his desires. Quality standards are, therefore, necessary to interpret to the producer the character and type of live animal that can be expected to process economically into the most desirable finished product.

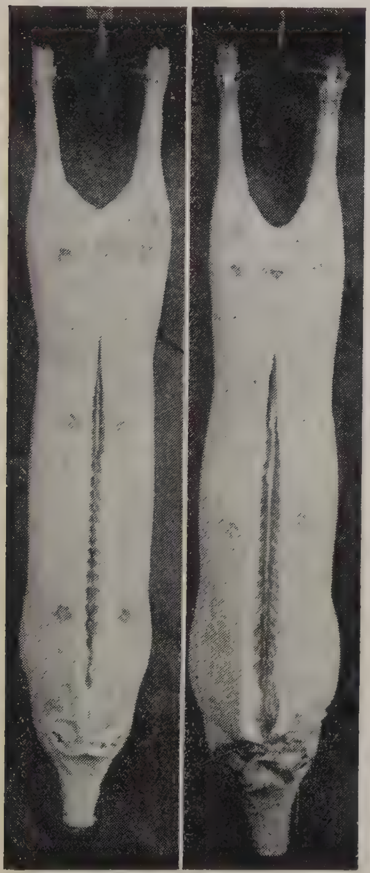


Fig. 7.—Good and bad proportioned pigs: Left—Heavy hind end and light fore end—good type. Right—Heavy fore end and light hind end—bad type.

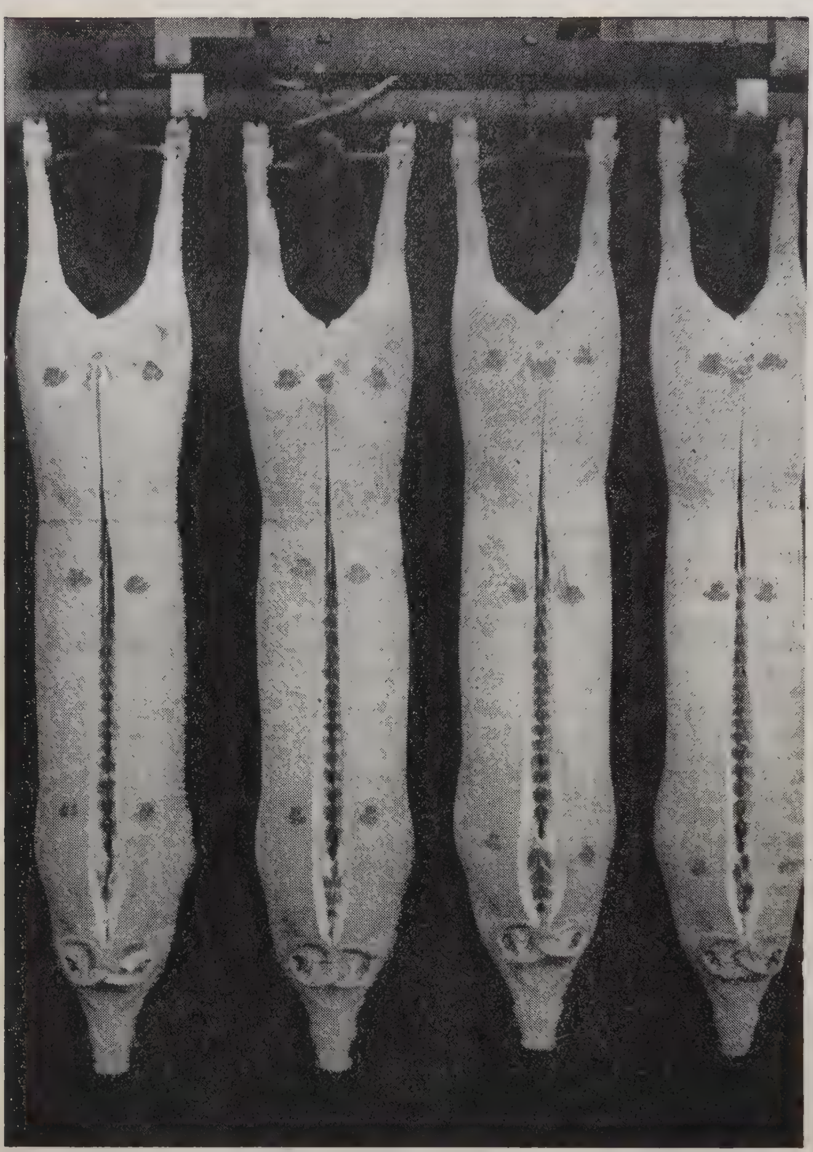


Fig. 8.—The type of pig the system is designed to select. This group won the 1944 Fletcher Competition with an average mark of 78½ points.

It is clear that those who produce pigs, those who market them, those who process them, and those who regulate and direct the industry all have responsibilities in determining the future of the industry. It is reassuring to know that by the attendance of over 1000 producers on different occasions at baconer competitions in July, 1944, and again in November, 1944, this responsibility is appreciated. It is clear, too, that the display of the meat industry's by-products is of great interest to the producer. Like the farmer who produces pigs as a means of utilising his dairy by-products, so the meat industry and the curer have to find a profitable avenue for disposing of their by-products in a marketable form, for which the manufacturer has certain standards of excellence. The new bacon-judging system gives these standards of excellence for pigs.

FERTILISER SUPPLIES

SPECIAL provision for supplies of organic fertiliser (dried blood, blood and bone and bonedust) will be made for the year ending December 31, 1945, for market gardeners, orchardists, home gardeners, hop and tobacco growers. In no circumstances will supplies of organic fertiliser be available for topdressing grasslands, and the balance of the material not required for the above purposes will be available to farmers either in the form of mixtures or for direct application to crops.

Some Parasitic Lesions Causing Condemnation of Lamb Livers

By

L. K. WHITTEN, Parasitologist, Wallaceville Animal Research Station, and E. J. BATHAM, Hydatid Research Officer, Otago Medical School.

ABOUT half the lamb livers in New Zealand show parasitic lesions, concerning whose nature considerable confusion exists. It is the object of this article to clarify the matter and to indicate how they can be differentiated.

THE lesions concerned are commonly referred to as milk-spots, white spots, hydatid cysts, tracks, and runnels. The first term is unsatisfactory, as they are entirely different in appearance from the well-known milk-spots in pig livers, due to focal *cirrhosis* caused by migrating *Ascaris* larvae. The white spots on lamb livers, on the other hand, are generally recognised as being caused by Cestode parasites, *Cysticercus tenuicollis* having been blamed by some, *Echinococcus* by others.

To gain a better understanding of the nature of these spots experimental infestations were made at Wallaceville. Seven lambs were dosed with *tenuicollis* eggs, five with *Echinococcus* eggs, and two were kept as controls, precautions being taken to prevent accidental infestation through feed or surroundings. On the subsequent slaughter of these lambs it was found that both kinds of eggs caused the typical "white spots" on lungs and livers, whereas the control animals were almost free.

The degree of infestation varied greatly, however. Two of the *tenuicollis*-dosed lambs became so heavily infested that one died after two weeks and the other after four weeks. The remainder, following the same doses of eggs, showed no marked symptoms and comparatively few lesions. At a glance many of the "spots" in *tenuicollis*-dosed lambs were similar to those in *Echinococcus*-infested ones, but a closer examination usually revealed certain differences which a consideration of the two life-histories will explain.

Cysticercus tenuicollis: The normal development of this parasite involves the ingestion with pasture of the eggs of a large tapeworm of dogs, *Taenia hydatigena*. The eggs hatch in the digestive tract, whereupon the embryos burrow through the intestinal wall and are carried to the liver in the portal blood stream. Here they develop into small cysts, which migrate to the surface of the liver, leaving reddish blood-filled tracks behind them in the damaged tissue. After two weeks the cysts are about 1/6th inch long, oval and translucent, with a small head rudiment at one end. At this stage some are able to pass through the liver capsule into the peritoneal cavity. Four weeks after infection the cysts which are still free in the peritoneal cavity measure about 1/3rd inch long. The head, which can be protruded and withdrawn by muscles of the cyst-wall, may at this stage show extremely slender tapeworm hooks and rudimentary suckers. The majority of these cysts eventually become attached to the omentum, where each grows rapidly, the hooks and suckers of its single large head becoming more strongly developed (Fig. 6). At this stage, if the cyst were eaten by a dog consuming raw offal, its head could develop into a complete adult tapeworm in the small intestine of the host.

This is the normal life cycle of the *tenuicollis* parasite. Commonly, however, the young cyst fails to escape from the liver. Sometimes, especially if it reaches the liver surface against the diaphragm or at the notch between the lobes, it develops *in situ* into a healthy, fertile cyst, seen as a clear bladder still attached to the liver. Very frequently such cysts degenerate, caseate, and calcify, and may be so deeply lodged in the notch that careful palpation or incision is required to detect them. The fibrous wall of these cysts is usually very thick. Some are difficult to "shell out," but in others this can be done and the degenerated remains of the cyst itself may be recognised.

More commonly, however, the resistance of the host appears to overcome and completely destroy the parasites at an early stage, the site being marked by a small pale zone of leucocytes and host fibrous tissue. This is the typical *tenuicollis* "white spot." Macroscopically it is cream coloured, opaque, and usually about

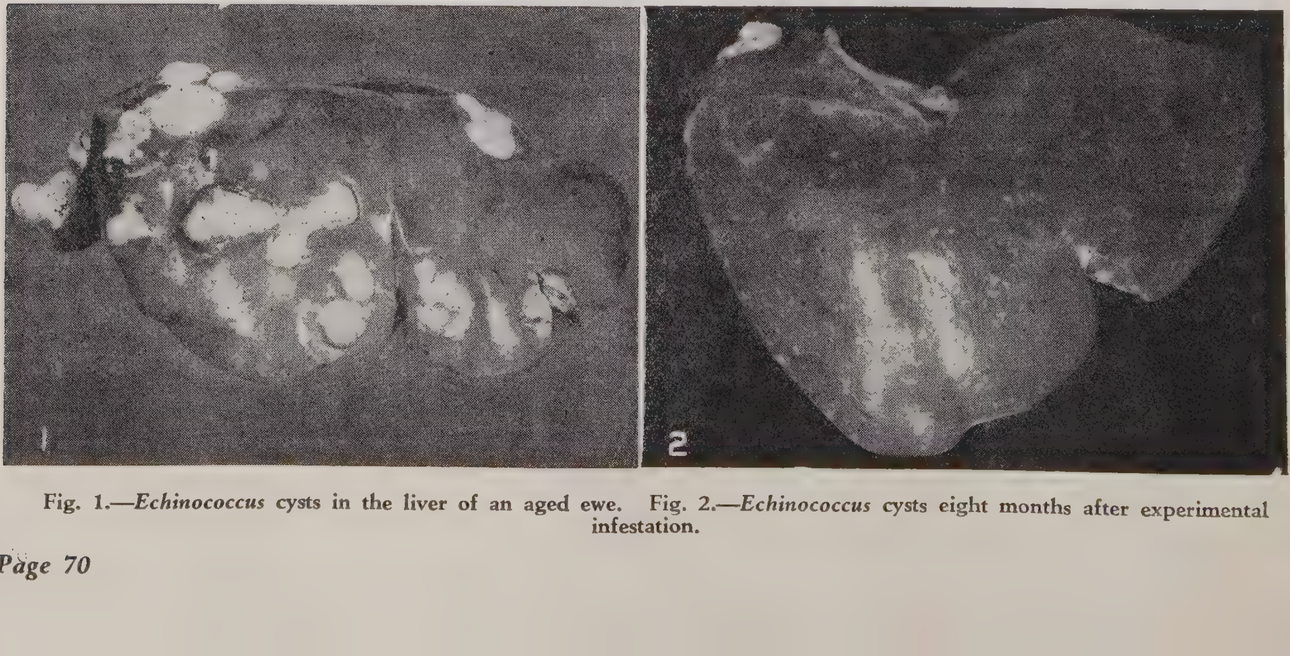
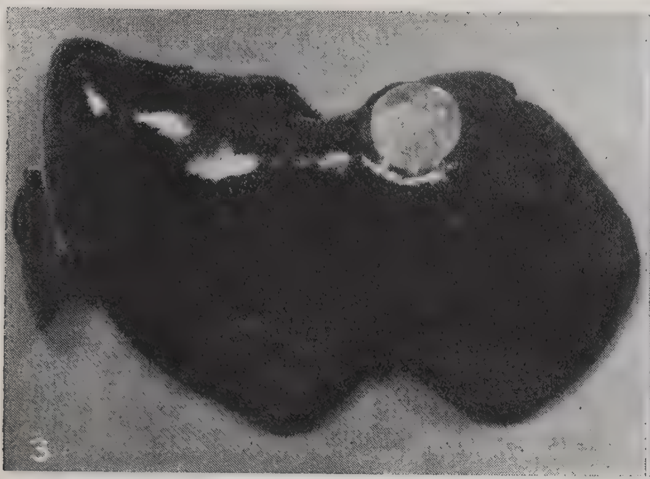


Fig. 1.—*Echinococcus* cysts in the liver of an aged ewe. Fig. 2.—*Echinococcus* cysts eight months after experimental infestation.



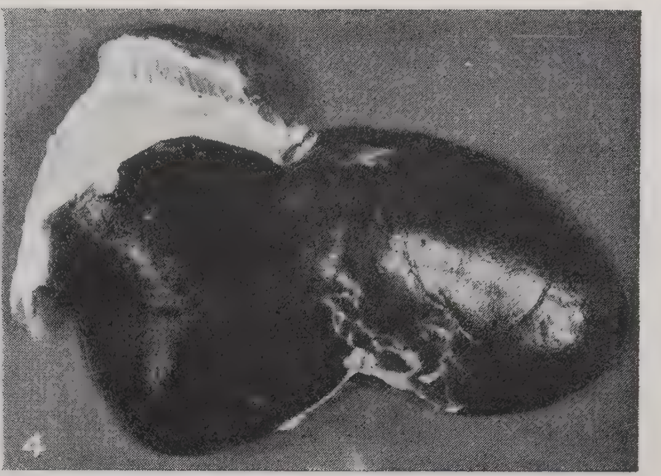


Fig. 3.—*Cysticercus tenuicollis*—mature cyst attached to liver of a lamb. Fig. 4—*Cysticercus tenuicollis*—degenerated cyst in notch. This liver also shows numerous "*tenuicollis*" spots.

an eighth of an inch in diamenter. If cut through, it shows continuous tissue, and never a fluid-filled cavity. Further, such spots are usually superficial, seldom occurring deep in the liver tissue. A similar white spot may be produced as a scar at the point where a viable cyst leaves the liver.

Another form of lesion frequently associated with *tenuicollis* infestations is a cream-coloured fibrous track, up to two or three inches in length. This is caused by the migration of a young cyst, probably chiefly one which does not survive. On section it is shown to consist of solid fibrous tissue, sometimes with caseation or calcification.

Hydatids (*Echinococcus granulosus*): A minute tapeworm in dogs, less than a quarter of an inch long, sheds eggs which similarly contaminate pastures and are eaten by lambs and other hosts. Again the hatched embryos pass through the intestinal wall to the blood stream, which carries them to liver, lungs, and sometimes other organs.

The work of Dévé has shown that, on entering the liver, most embryos become arrested inside hepatic lobules. Here they develop directly into non-muscular cysts, without the subsequent migration that characterises young "*tenuicollis*" parasites. This explains why all our *Echinococcus*-infested lambs on careful examination showed most spots or cysts buried deeply in the tissue, while nearly all the "*tenuicollis*" spots were superficial.

Growth and development of the *Echinococcus* cyst in the liver is extraordinarily slow. After three months it is seldom more than 1/8th inch in diameter. The parasite itself is a hollow sphere, filled with clear fluid and

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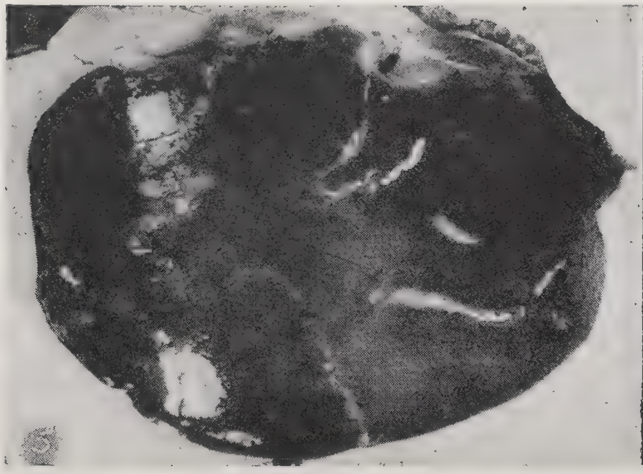

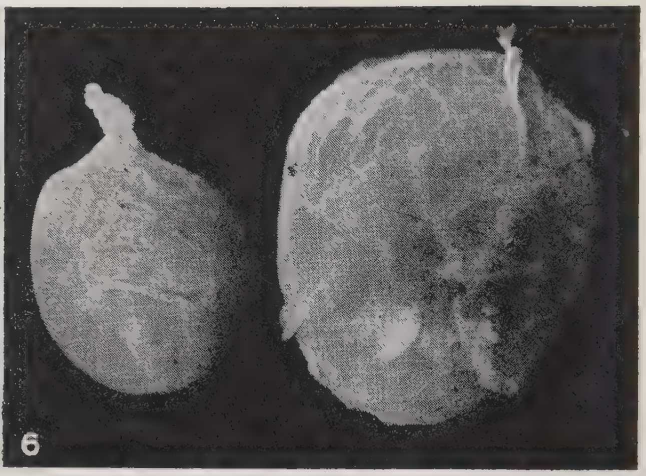

Fig. 5—*Cysticercus tenuicollis*—Burrows caused by migrating immature cysts. Fig. 6—*Cysticercus tenuicollis* from the omentum of a lamb, before and after the removal of the fibrous capsule.

lined with a very thin layer of cells, which secretes on its outer surface a laminated membrane. Muscle layers are absent. Outside this membrane is a white fibrous zone, formed by the host as a reaction against the parasite. To the naked eye such a cyst is not unlike a "*tenuicollis*" spot, though usually more translucent. The central cavity, however, filled with clear fluid in a living cyst, or with free caseous or calcified material in a dead one, generally serves to distinguish it.

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Whereas some hydatid cysts remain sterile, most, after a long period of growth, begin to bud from the inner surface of their cell-lining brood-capsules containing worm-heads. These clusters of worm-heads form numerous minute specks, each smaller than a pin's head in size. It is curious that, whereas hydatid cysts are much commoner in the lungs of sheep than in the livers, those occurring in livers usually produce many more brood-capsules. Sometimes, in old damaged cysts, brood-capsules or scolices may grow into daughter cysts, which fill the original cavity. But such a condition, common in human hydatids, is only rarely seen in sheep.

Both *tenuicollis* and hydatid lesions are extremely common in lamb and sheep livers in New Zealand. The proportion of animals infested varies among different farms and among different districts, and may even reach 90 or 100 per cent. in individual lines of lambs. Lambs also show seasonal variation, presumably because those killed last have had longest to become infested. The following results, based on 8,000 lamb livers from the Styx district in Otago, show this point:—

Percentage of Lamb Livers showing "Spots."

Jan.	Feb.	Mar.	Apr.	May.	June.
27	45	47	54	55	71

Examination of lines at abattoirs indicates that lamb livers are more frequently condemned for "*tenuicollis*" than for *Echinococcus* lesions. In sheep, however, it would appear that the liver tissue damaged by the former parasite has resumed its normal appearance; whereas *Echinococcus* cysts are by then large enough to be apparent, even if deeply buried. As lamb livers from which more than three lesions have been removed are condemned for export, the annual financial loss from this cause, together with condemnation of adult sheep livers—mostly for *Echinococcus*—has been estimated at about £200,000. In addition, hydatid disease in humans (caught from dogs that have eaten cysts) causes over 100 hospital cases annually, with a dozen or more deaths. Hence, eradication of these parasites is desirable. To break both life cycles dogs should be dosed regularly with arecoline to remove worms, and should be prevented from eating raw sheep offal so that re-infestation does not occur.

POTATO PRODUCTION

FARMERS are to be congratulated on the excellent response to the Government's appeal for a greater acreage of potatoes to be grown during the coming season. Preliminary estimates indicate that 32,000 acres will be grown this season as compared with 27,000 acres grown during season 1943-44. The Allied Forces will thus be materially helped by having a greater supply of fresh potatoes made available.

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Pure Milk Production

Contributed by the Livestock Division.

MILK is a valuable food, almost indispensable for the young, readily digested and assimilated. By its very nature it is extremely vulnerable to bacterial contamination at any stage between the cow and the consumer. It is the producion of milk for consumption as such which is dealt with here.

THE production of pure and good-quality milk should be the aim of everyone engaged in milk production, whether for factory supply or for human consumption as milk. Defects in the purity of milk for cheese making, or of cream for butter making, may have an unfavourable effect on the resulting product. Where the milk is intended for human consumption as such in its untreated condition such defects become still more important, since they may affect human health, or may lead to waste through interfering with the keeping quality of the milk.

Legally, the production of milk for sale for consumption as milk is governed by the Dairy (Milk Supply) Regulations, 1939, which are administered by the Livestock Division of the Department of Agriculture. They lay down conditions regarding the structure and cleanliness of premises and plant, and provide for registration under three headings:—**Unconditional,** where premises, etc., comply in all respects; **Conditional,** which is granted pending completion of certain requirements; and **Temporary,** which may be granted for a short period only during an acute shortage of regular supplies.

Briefly, the important requirements for clean milk call for a proper site, providing good drainage, sufficient concrete to accommodate the maximum number of cows to be handled and to give clean approach to the shed and exit from it, a shed structure allowing of efficient cleaning and therefore with the minimum of rails and obstructions, a splendid water supply, which if relied on for cooling should be of sufficiently low temperature, and water-heating facilities giving sufficient boiling water to allow of proper sterilisation of all plant and utensils. Many heaters in use are not large enough. Equally important is an attitude of constant vigilance on the part of the staff, so that the somewhat exacting routine required to maintain strict cleanliness is carried through at every milking.

Defects of milk may be grouped under two headings:—

FAULTS PRESENT IN MILK WHEN DRAWN FROM COW.

Flavours may be due to certain ingredients in the food. Turnips are a common example. Both the milk, if untreated, and the butter, even with treatment of the cream, may have a turnip flavour where this food is fed without proper care, and notably if cows are turned into the crop. Feeding the turnip ration immediately after milking with a reasonable amount of hay will largely avoid this. Other foods, such as chou moellier and excess clover in the pastures in the spring, may have an effect on the milk, but the characteristic flavour from wild garlic and hog cress (twin cress) would be more pronounced. Access to such areas should be prevented if possible. Full aeration of the milk and leaving of lids off cans for a period will reduce flavour somewhat. Certain drugs have a harmful effect; a dose of turpentine will affect the milk for nearly 36 hours; iodoform used as a uterine pessary can be very obnoxious, and no highly odorous substance should be used in any udder dressing where the milk is being used.

The inclusion of milk from cows being dried off and milked once a day or every other day is not desirable.

Alterations in the Chemical Composition due to feed are a somewhat disputed factor. Most research indicates that there is no influence from the food on the fat content. Perkins at Ohio in 1932 came to the conclusion that variations in the protein content of the food produced only relatively minor alterations in the non-fat solids. Increases of protein caused only a small increase in the non-protein nitrogen, together with a slight decrease (6 per cent.) in the total nitrogen present in the casein. Rowlands (N.I.R.D. paper 704 June 42) stated that the causes of variation in solids not fat depended on (1) breed; (2) season—lower in summer, particularly a hot, dry summer; (3) stage of lactation—a decrease when drying off; and (4) disease of the udder—the presence of a subclinical mastitis significantly affected the casein.

Supplementary feeding during the hot, dry summer period lessened the drop in solids not fat. The influence of mastitis should be kept in mind.

Disease Organisms present in milk when drawn. The tuberculosis bacillus is undoubtedly the most important of these. While cows with tuberculosis of the udder—a condition comparatively rare in New Zealand—are the most dangerous in this respect, the organism may also be present in milk from cows in which no disease of the udder can be detected, particularly if they have the disease in an advanced or active and extensive form. Clinical examination of the herd should detect such cases. The tuberculin test will indicate all infected animals, but may lead to heavy condemnation in a herd where the infection is extensive.

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Free Bulletins

No. 181—Sheep Dipping and Sheep Dipping Baths.
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Apply to your local office of the Department of Agriculture.

The Brucella abortus organism, the cause of contagious abortion disease in cattle, may be present in the milk of infected cows. It is a potential cause of recurrent fever in humans, though most consumers have some acquired immunity. Some human cases are due to handling and treating infected cattle. Pasteurisation will destroy the organism, and, if efficient, that of tuberculosis also.

Owing to the prevalence of mastitis the causal organisms of the common streptococcal mastitis may be present in milk. There is no evidence that they affect human health, but isolated cases have occurred in which organisms of different type, sometimes of human origin, have become localised in the udder, and have set up human disease. The milk from acute obvious cases of mastitis, from newly-calved cows, and those showing retention of the after-birth is excluded from human milk supply, as should be that of a cow showing any type of obvious illness.

Blood may be present: usually this is small in amount and may not be evident until the milk has stood for a time. It is more common in freshly-calved cows, where the udder is under considerable tension and small blood vessels are liable to rupture; other cases are due to external injury to the udder or teat.

2. FAULTS DUE TO INTRODUCED CONTAMINATION.

Introduced contamination has a great influence on the keeping quality of the milk, and some on its physical properties. There has always been some controversy between the supporters of hand milking and machine milking as to which produces the cleaner milk. Hand milking calls for the strictest cleanliness of the cow, her udder and teats, and the milker's hands, and the use of a three-quarter covered pail to prevent hair and dust falling in during milking. Machine milking enables the milk to be conveyed from the cow to the releaser with minimum exposure to the air, but the milk is exposed to a much greater risk of bacterial contamination if anything less than a strictly sterile condition exists of the long channel of milk cup and tube and pipeline through which it must pass.

As machine milking is standard practice, clean milk production is viewed from this angle. Concrete shed floors and yards (required by the regulations), concrete approaches, and clean gateways might seem to have a somewhat distant relation to clean milk. Consideration of the state of the hands of a milker who at the same time has to bail up and leg-rope rows having to wade through a dirty entrance, together with the amount of extra washing of udders required, will quickly correct this impression.

If these requirements are observed, it may be expected that cows will arrive in the milking bail in a comparatively clean condition. Quietness in handling has a bearing on keeping clean yards, and is important in attaining the right frame of mind in the cow for her to give her milk readily.

Factors necessary to prevent contamination in the milk after it is drawn from the cow must now be considered.

Proper washing and **drying** of the udder is important. If the udder is left wet, water dripping from the teats is a source of contamination. The water should be changed frequently, and any cloths washed and sterilised regularly. The ideal is a water tap in each bail with a hose and rubber brush.

It is sometimes the practice to wash udders and even "start" the teats some little time before cups are applied. Handling of the udder and manipulation of the teats increases the blood flow of the parts and the local blood pressure, setting up the ideal condition for quick milking, even to the stage of a trickle of milk from teats. If the effect of this stimulation is allowed to fade out again, it is more difficult to regain, so that to obtain best results udder washing and handling should not be done until the milker is just ready to put on the cups.

Grooming of cows and clipping of long hair from udders is advocated in many articles on clean milk production, but is probably less important where machines are used.

Stripping. There is a good deal of evidence that as soon as a routine is established the non-stripping of cows

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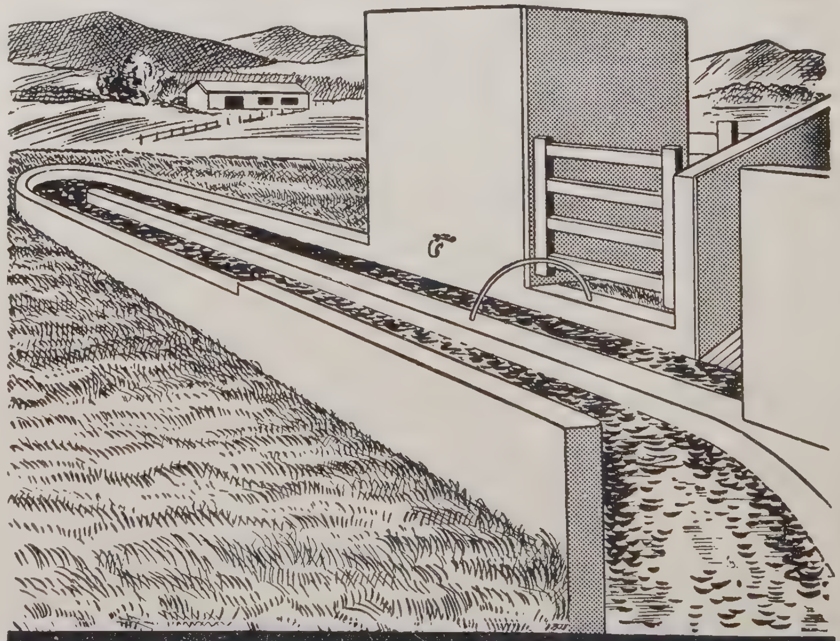
10.3



WILSONS N.Z. PORTLAND CEMENT LTD

does not materially influence total butter-fat production. Stripping is liable to be hurriedly performed, and certainly unless a proper pail is used to minimise dust and hair contamination its omission would probably assist in maintaining a clean product.

Cleanliness of Cups and Milk Line. This is highly important, and failure to attend to it is responsible for many of the breakdowns in clean milk production. The process required is fully described in Bulletins 118 and 118a. It is not complicated, but to get proper results the routine must be carried out thoroughly, in the proper order, and after each milking. Briefly, it consists of (1) flushing out all residue with cold water as soon as possible after milking; (2) thorough cleansing, using a detergent (grease-removing) solution of soda, etc., dissolved in boiling water; (3) sterilisation by means of water, which should be as near boiling point as possible. Faults sometimes met are failure properly to dismantle parts, to wash out thoroughly before using heat or soda, or to use water sufficiently hot to sterilise. Sterilisation of the plant is stressed, but the same process must be applied to any vat cooler or can through which the milk passes or in which it is held. The above process, therefore, calls for good water supply and adequate heating arrangements.

Stringy Milk or Slimy Milk, the condition being evident after standing some hours, is usually due to bacterial contamination from an imperfectly-sterilised bucket or container.

Cooling. Milk is an ideal medium for many types of organism to multiply in. Many can do so at so-called room temperature. Cooling has an extremely important effect on the length of time milk will keep sweet. Milk of only moderate purity, efficiently and promptly cooled and **kept** cool, will outlast an originally much cleaner milk kept at a higher temperature, since the small number of organisms originally present in the latter can quickly multiply. Coolers are of various types, but all depend on water cooling, the milk flowing over the outside of a flat corrugated container through which cold water circulates to remove the heat. The regulations specify reduction to 65 deg. F., but it must be admitted that this is a minimum requirement, and reduction to 55 deg. is preferable. The temperature of the water is, of course, the important factor, and must be at least 5 deg. lower than that to which it is desired to bring the milk. Bore or well water is usually cold, and it is a good plan to pump direct from the well through the cooler to the tanks, and thus eliminate waste and obtain the greatest efficiency from water available. Coolers will rarely operate satisfactorily off a town supply or a supply held in overhead tank, or conveyed some distance in surface pipe, since its temperature will usually be above 60 deg. in the very season of the year—summer—when efficient cooling is imperative. Size of cooler in relation to amount of milk is important, since it governs rate of flow. If too fast, maximum cooling effect is lost.

Many up-to-date sheds now have refrigeration, and water from this may be available. Maintenance of the milk at proper temperature is important, if it is not to be delivered immediately. In certain cold times of the year a concrete milk house will ensure this. In summer and in warmer latitudes a refrigerator is the ideal; otherwise cans may be placed in cold water, which should be circulating, or if stood in a draught and covered with a damp cloth, evaporation from this helps to keep them cool.

Throughout the rest of their passage to the consumer cans should, as far as possible, be protected from direct sunlight.

Bottled milk provides the most satisfactory means of distribution, providing bottles are sterilised before being filled with milk.

It is a breach of the Dairy (Milk Supply) Regulations to fill bottles with milk other than in the milk house or bottling room.

No cap-discs are to be carried on the conveyance used for delivery. Regulation 12 of Dairy (Milk Supply) Regulations covers above matters regarding bottling of milk.

CONTAGIOUS ABORTION VACCINATION

How Farmers Can Assist

THE good results attending the use of strain 19 vaccine for contagious abortion are now well known to the dairy farmer, and it is expected that there will be a considerable increase in the number of calves vaccinated this year.

IN the past there has been considerable delay on many farms because of the failure on the farmer's part to have his calves handy, and to have reasonable facilities for handling them. As the vaccination is best carried out when calves are 4 to 8 months old, it is obvious that the majority of the work must be done in a short time, and the full co-operation of all farmers is needed to get through the work at the proper time of the year.

Whenever possible the farmer is advised of the day and hour when vaccination will be carried out. Have the calves handy. Have a list of the identification marks and birth dates of calves to be done, so that they can be readily checked up with those given on your application form.

The calf bail is probably the best means of restraining the calf for vaccination. A race sufficiently narrow to prevent the calves from turning round is also very satisfactory. Driving the calves into the cowbail or manhandling each calf individually does not appeal, unless the number of calves to be done is small. If repairs are needed, do them before the vaccinating officer arrives.

Remember that the vaccination is done for your benefit. Show that you appreciate the service by co-operating fully with the vaccinating officer, enabling him to do the job quickly and efficiently.

—R. P. GILDER, B.V.Sc.,
Veterinarian, Palmerston North.

BRITAIN'S BUTTER RATION

BRITAIN'S butter ration is only 2 oz. per person per week. To assist her to maintain this ration farmers are called upon to produce to capacity to reach the target of 113,500 tons. Present indications suggest that the season will be favourable. It would appear that the amount of cheese aimed at is more likely to be attained, as is shown by the fact that several cheese factories have already found it necessary to run a night shift.

PRODUCTION OF ONIONS

ONION farmers are to be congratulated on the excellent response to the appeal for greater production of onions. Estimates indicate that 1,800 acres of onions will be grown this season, which is about double the quantity grown last season. This will result not only in New Zealand's civilian needs being met but also in large supplies being made available to the Armed Forces in the Pacific.

Treat your sheep as blowfly strike is noticed during periodical inspection of flocks

with this new

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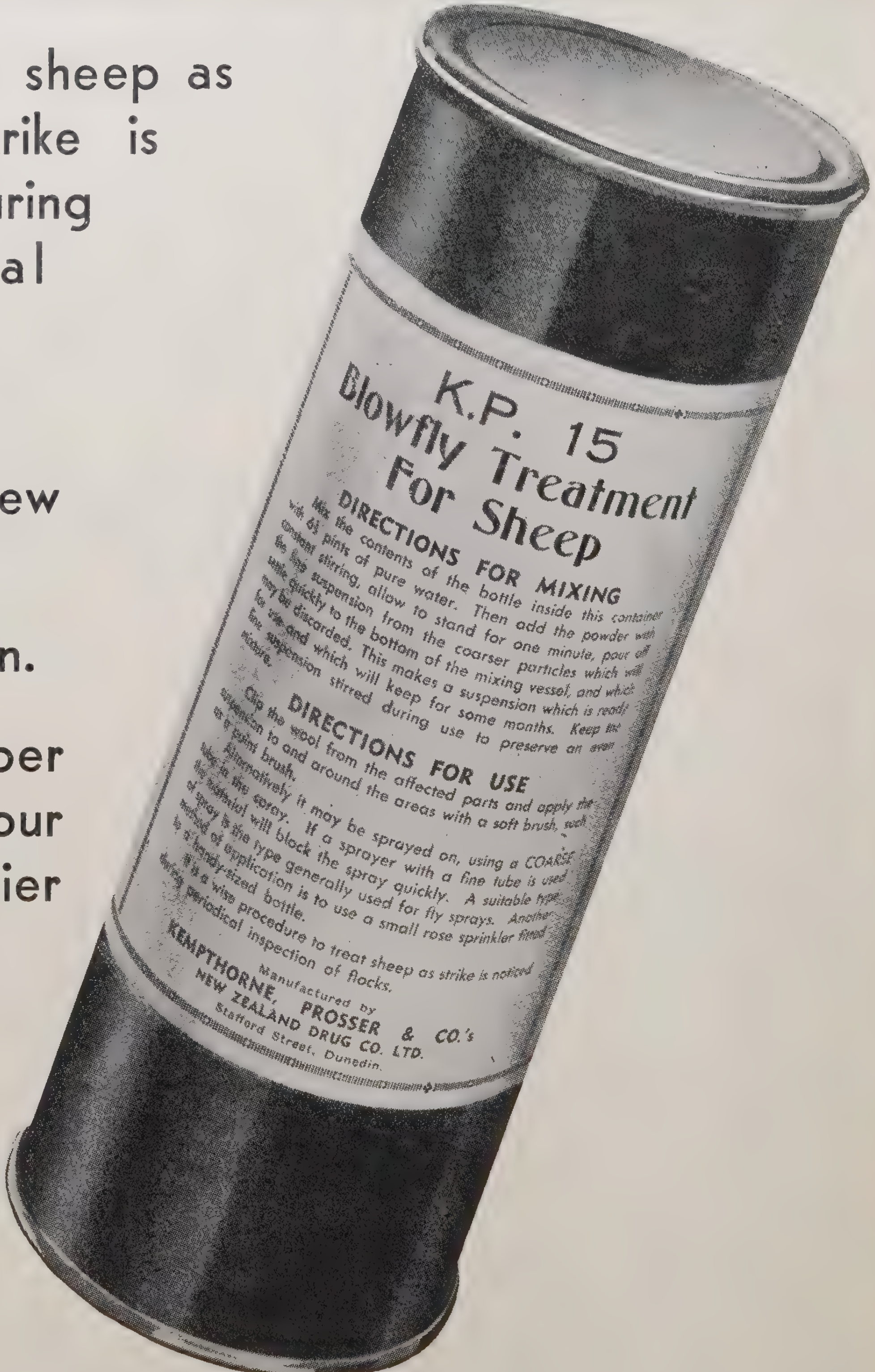
preparation.

Price 6/6 per tin from your usual supplier

— quickly mixed for use, and will keep for months



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DUNEDIN

VETERINARY NOTES

The Body Louse of Sheep

WHILE inspecting sheep for evidence of lice infestation at saleyards in the North Island I have frequently been asked by interested spectators what the lice are like; many farmers have said that they had never seen a sheep louse and have asked to be shown one. In view of the approaching dipping season it is hoped that these notes on the sheep louse will prove of interest and assistance to readers who may be in doubt as to the appearance and control of the parasite.

Description and Life Cycle

The sheep body louse is a biting insect, light-grey, almost white in colour, head and thorax iron red, and when full grown it slightly exceeds 1-25th of an inch in length. It has short three-jointed antennae and a large prominent head and eyes. Keen eyesight is necessary to see it in the early stages of its life. The body louse of sheep is not a blood-sucker, but it feeds upon the products of the wool and skin.

The eggs, commonly called "nits," are a dirty white in colour, oval in shape, and they are attached to the wool close to the body of the sheep by a sticky substance emitted by the parent. Each egg is protected by a coating of fatty matter which acts as a protection against the action of dips, so that though the lice themselves are killed by the dips, their eggs are not. The eggs hatch out in from 6 to 8 days and the young reach sexual maturity in 16 to 18 days from hatching, so that there is a complete life cycle about every three weeks. The length of the egg stage and the time taken to reach sexual maturity may, however, vary a little, according to locality and climatic conditions. The adult insect is capable of laying one hundred or more eggs.

Lice infestation is a very serious menace to the welfare of sheep, as, owing to continual restlessness caused through intense irritation, the vitality and condition of the animals are rapidly reduced, proper growth of wool is retarded, and the fleece is seriously damaged through constant rubbing against fences, logs, and other objects.

As a result of the reduced vitality the louse-infested sheep naturally becomes a prey to other ailments more readily, and it is likely that much of the difficulty experienced in raising young sheep in this country would be at least minimised if sheep owners exercised greater care in seeing that their lambs are maintained free from lice. The rigour of the winter months demands that every endeavour should be made to rid the lambs as much as possible of anything likely to undermine the constitution.

Methods of Detection

In the majority of cases where sheep are affected with lice there are generally outward and visible signs of the trouble, consisting of poorness of condition, a dry, hungry, or scoured appearance of the wool, and the fleece is also often broken and tufted, portions having been torn out by the sheep rubbing themselves against fences, etc., in an endeavour to allay the intense irritation set up by the vermin.

In order, however, definitely to satisfy oneself as to the presence of lice, a closer examination is necessary, and therefore the sheep must be caught and turned towards the best available light. The wool should then be parted so as to expose the skin and the sheep examined carefully, especially the parts around the brisket, neck, and shoulders, and well up about the ears. Lice are sometimes found about the ears when nowhere else, owing to want of thorough immersion of the sheep when being dipped, the ears thus escaping treatment and remaining a breeding ground and starting point for fresh infestation. Lice will generally be found well down on the skin, and in badly-affected cases the skin is scaly and lacks that pink colour characteristic of the clean, healthy sheep.

The idea which largely prevails amongst sheep owners—that lice are a necessary concomitant to poverty—is entirely erroneous. Neither lice nor ticks can arise spontaneously.

Low condition is certainly conducive to the increase of vermin, but if a sheep was absolutely clean and not exposed to infection from some source such as other sheep, scratching places such as fences, logs, etc., and yards about which there may be wool containing eggs or living lice, it would not develop vermin, no matter how poor in condition it became. Lice will spread rapidly from animal to animal by contact, and eggs or living lice in cast strands of wool are capable of infecting other sheep.

Treatment

For the successful suppression of lice on sheep it is obvious that dipping must be universally carried out and on thoroughly effective lines. A clean muster is very necessary in order to ensure that all sheep on the property are dipped. Whatever dip is used it should be mixed strictly in accordance with the instructions of the manufacturer, and in this connection it is very necessary that the sheep farmer should gauge accurately the amount of water for mixing in accordance with the directions. In many cases this important point is not given due attention, but is only roughly estimated.

Before commencing dipping the dip should be thoroughly stirred from end to end and care should be taken to see that each sheep is given thorough immersion for the full minute. A very important point in order to secure the best results from dipping is to see that the dip does not get too dirty. A clean dip is essential for the destruction of vermin, and dirt in a dip is very frequently the cause of unsatisfactory results, as the dip is rendered ineffective. Hard water is very often the cause of bad mixing, and to counteract this 3lb. of washing soda added to each 100 gallons of water will be of considerable assistance.

Where a large number of sheep are to be dealt with, the 60ft. long dip is the best, but where a small flock is kept a less expensive dip, and yet just as effective, may be constructed by adopting the semi-circular type of dip. The advantage of this bath is that the sheep may be kept swimming about for the full minute before being released, whereas in the short, straight dips the sheep are not always retained sufficiently long to ensure thorough immersion. The dips do not kill the eggs or "nits" of the lice, so that, especially in cases where sheep are badly infested, a second dipping is necessary, say, about two weeks after the first one. This second dipping

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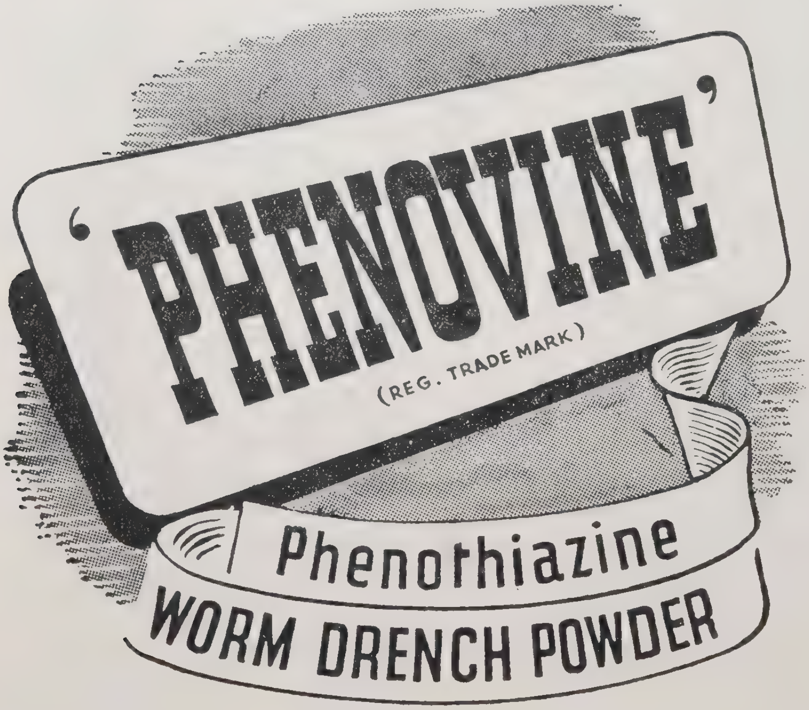
IMPORTANT — DIPPING RAMS

Sheep Dip Manufacturers call farmers' attention to the dangerous practice of dipping rams too late in the season. To avoid the likelihood of undesirable after-dipping effects, it is essential that rams should be dipped early in the season and well before flushing occurs.

No responsibility will be accepted for any damage or loss sustained owing to this instruction not being carried out.



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SECONDLY because, unlike any other drug, it sterilises the worm eggs at dosing and for a period of 4 to 5 days thereafter. Consider that one infected sheep can deposit up to *40 million* eggs on the pasture *daily* and you realise what this means . . . . *one dosing destroys up to 200 million eggs for every sheep dosed ! ! !*

This extraordinary control explains why the demand for 'PHENOVINE' is exceeding the war-time supply.

Write for informative Booklet.

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ALWAYS REMEMBER THAT YOUR GREATEST LOSS FROM WORMS IS NOT SO MUCH IN DEATHS AS IN THE SETBACK SUFFERED BY THE FLOCK IN GENERAL.

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Also COOPER'S WORM DRENCH
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For Liver Fluke and blood sucking Worms.

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(Nicotine, Copper-Sulphate, Cobalt)
For Black Scour producing Worms—common in lambs.

would destroy the lice hatching from eggs not affected by the first dipping and before these lice could mature and lay eggs themselves.

There is a diversity of opinion regarding the best time to dip sheep, but it is a very good plan to dip soon after shearing, when sufficient wool has grown again to hold the dip, and again later on, but during the statutory dipping period, which in the North Island is between January 1 and March 31 each year, and elsewhere than the North Island between January 1 and April 30 each year. The first operation costs comparatively little, owing to the shortness of the wool, and it rids the lambs of the parasites which desert the older sheep as soon as shorn. Where this practice is adopted a poisonous powder dip should be used for the second dipping, on account of its more lasting effect, and this will result in the flock being in a good, clean condition to face the winter months.

It is an offence against the provisions of the Stock Act, 1908, to expose sheep affected with lice in a saleyard, and a maximum penalty of £20 is provided by the Act for such an offence.

—*J. D. ANDERSON, Principal Inspector, Christchurch.*

CARE IN DIPPING

ONE of the ingredients included in most of the sheep dips sold in this country before the war was powdered derris root, or its equivalent. This material made the dip faster and more effective, especially against ked pupae (often referred to as "tick eggs"). Since derris has been unobtainable there has been a marked increase in the incidence of lice and ticks in all parts of the country. To make the most effective use of dips now available farmers should be most careful to follow faithfully the manufacturer's instructions. In some cases it may be necessary to dip twice at an interval of 21-28 days to get a complete kill.

Answers to Correspondents

Severe Mammitis

"Mammitis," Canterbury:

This season I have had two cows affected with a very virulent form of mammitis. The first case occurred about 5 to 6 weeks ago. The cow was observed to show signs of pain, was looking bad, and off her feed, and this a week before she calved. She was isolated, covered, and looked after, but as the udder appeared quite soft, no one thought of mammitis. After calving, which was quite normal, the cow was brought in for milking, when it was found that one back quarter contained an evil-smelling, reddish-brown liquid, and in one day became as hard as concrete, and only a very small quantity could be extracted; rubbing was quite useless. The cow lingered (on good feed) for about 4 weeks, then died. The second cow, never within several hundred yards of the first case, was seen to be similarly affected, also before calving. She was brought in immediately and milked. She also was affected in one hind quarter, with the evil-smelling liquid, but not until she calved, about four days later and five weeks after the first cow (a dead calf) did the quarter go hard. Now she is off feed too, losing condition, and seems likely to follow the first. No. 1 cow was dried off to barely covering the bottom of a testing bucket. No. 2 went out with very sore teats (skin disease), which made it almost impossible to milk her at all, and she carried quite a bag for some time. The cows ran in the same paddock until No. 1 was brought in. Twenty-five cows have come in quite sound from the same paddock. Can you give me any cause or reason for the affection? Both cows were big, healthy-looking Shorthorn - Friesian cross. I might add that this is the first occasion of mammitis in four years and there have been very few cases of chills in the udder. In fact, only once before in 20 years' experience have I had a case of such severity, when the cow also died of it. This was in another district altogether.

LIVESTOCK DIVISION:—

Both your cows were affected with gangrenous mammitis, which generally leads on to blood poisoning and death. The disease was present in the udder before calving, and began to show up when the formation of milk was beginning. The attack increased in severity until the udder symptoms were shown a few days after calving, at the time the flush of milk was at its highest point. It is possible that both cows had the mammitis germs in the udder when they were dried off; this applies more particularly to cow No. 2, as she had very sore teats and could not be properly dried off.

As there is no recognised cure for mammitis the recommended treatment is as follows:—

As soon as the complaint is noticed isolate the cow in a paddock with not too much feed in it. Give a purgative drench of Epsom or Glauber salts, ginger, molasses, and water, with the idea of lessening the milk production. Keep the quarter stripped out every two to three hours into a disinfectant solution. At the commencement apply icy cold applications several times daily, changing these after about 48 hours to hot applications. Apply belladonna and soap liniment with gentle massage after every application. Scrupulous cleanliness must be observed to prevent the spread of the disease, and if possible a separate attendant should look after the affected cows.

This is why you DIP...

this is why you need

VIPER

POWDER DIP

Viper kills lice, ticks or keds with absolute certainty.

But Viper's killing power is enhanced by the fact that it is particularly finely ground . . . mixes well with cold water . . . and is thus *thoroughly distributed* through the fleece. Well-dipped sheep fatten quicker and produce a heavier clip.

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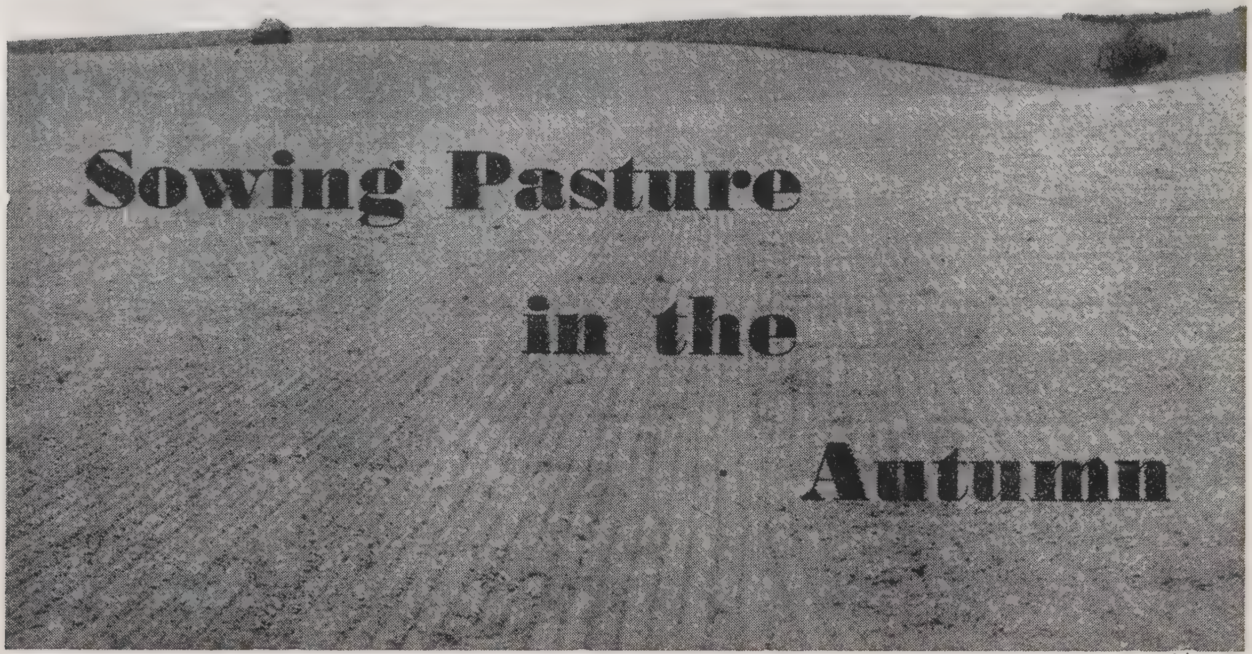


Sowing Pasture in the Autumn

The preparation of the soil must be thorough for the seed to be sown in a sweet, fine, and firm bed.

THEREFORE—

★ 1. Harrow the ground frequently in the summer and especially shortly after every fall of rain.

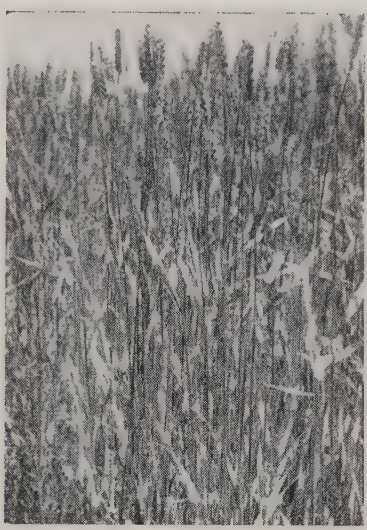
★ 2. Roll before sowing.

★ 3. On light soils roll also after the seed has been sown and covered.

Consolidation ensures a satisfactory strike of the sown species and is of particular importance as far as clover establishment is concerned.

SEASONAL NOTES

Grow More Wheat in 1945-46



FARMERS were advised in these notes for November that the wheat production objective should be maintained, and since that the Hon. Minister of Agriculture has announced that our objective for the 1945-46 season has been set at 300,000 acres. All farmers should therefore co-operate in the drive for this acreage which is being conducted by District Councils of Primary Production, assisted by other organisations. This season we are producing about two-thirds of our needs, and will have to depend on outside supplies for the remainder.

To encourage the production of the requisite acreage the prices for 1946 will be on a graduated scale, rising as the average sown throughout the Dominion increases, as follows:—

Acres sown.	Price.
200,000	6/6
205,000	6/7
210,000	6/8
215,000	6/9
220,000	6/10
225,000	6/10½
230,000	6/11
235,000	6/11½
240,000	7/-
245,000	7/0½
250,000 (and upwards)	7/1

The above prices are for Tuscan March basis and the usual premiums for other varieties and increments in other months will apply.

Expansion in wheat acreage can be brought about by:—

(a) Increased sowings by wheat growers.

(b) Sowings by farmers who do not grow wheat as a rule and live in wheat-growing districts.

(c) Sowings by farmers in districts suitable for wheat but where wheat is not grown to a great extent.

The header harvester has eased the burden of wheat growing to a very large extent, and increases in areas of wheat will be more readily obtained in districts where the header harvester can be used. Some wheat growers in these districts are producing as much wheat as they can handle, or they are sowing all the land on the farm that is in a suitable condition for wheat. However, in view of the smaller acreage sown this season, there will not be many farmers in that category, and there are many farms in header-harvester districts on which little wheat is normally grown and with large areas in pasture for grazing, a proportion of which could be utilised for wheat.

Farmers in districts where wheat is not grown to a large extent, but where it can be grown and harvested satisfactorily, can help also. In such districts as Hawke's Bay, Wairarapa, Marton, Southland, and South Otago wheat has been and can again be grown satisfactorily.

If attention has not already been given to surface working of lea land for autumn- and winter-sown wheat, the skim plough or hustler should be set in action, for the earlier this is done the better. If the ground is hard, the hustler will have to be used, but if the soil is sufficiently moistened by the rain, the skim plough can be utilised.

At present it appears that wheat is the most important food commodity that the farmer can produce. Let us therefore aim at the production target of 300,000 acres of wheat in 1945-46.

◆

Water Supply

AT this time of the year the need for an adequate, never-failing water supply for stock is brought home to the farmer. The ideal for both sheep farmer and dairy farmer is water in every field. On country well supplied with streams this object is readily achieved with the minimum of artificial measures, but in country where streams are not numerous, or where these dry up at critical periods, boring or pumping has to be resorted to.

On some country boring is not successful, and in such country where streams are also not present pastoral development is certain to be seriously retarded. In such areas the lack of water supply can be overcome by the provision of dams from which water can be piped to various parts of the farm. The catchment area for supplying water to the dams should be kept fenced from stock, and is best planted in trees which can be put to good use in providing shelter and timber when mature. The dam also should be protected from stock and surrounded with trees to keep the water cool in summer and prevent evaporation. The catchment area and the dam should be large enough to supply sufficient water for the stock to last through the longest drought. The dams may be constructed of concrete or of earth. The construction should be such that it will withstand the pressure of water when full, and, if of earth, the banks should be sown with pasture as soon as constructed to mitigate overflow from the dam and rain washing away the soil until the trees are properly established.

Whilst dam water is not as suitable as water from bores or running streams it is infinitely better than no water, and if the catchment area and dam are protected from fouling by stock they will provide reasonably safe water. If they are not so protected, the dam water may become a dangerous source of parasitic infection, particularly of young stock.

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Feeding Summer Supplements

THE ambition of most fat lamb farmers in the plains and rolling country is to finish up the season with only breeding stock on hand, and to get rid of every lamb for fattening and all cast-off ewes before tupping.

In most parts of the North Island this programme does not usually present much difficulty, but in drier areas of the South special provision has to be made to finish off the weaned lambs; special crops have to be grown and the sowing of these has to be carefully timed so that they are at the best stage for feeding when the lambs are weaned.

Rape Most Popular

Rape is still the most popular crop for finishing off lambs, undoubtedly because of its superior feeding value and fattening qualities. Best results are secured if it is fed when the leaves are light blue in colour. Lambs should not be put on to the rape immediately they are weaned, but should be given a day or two to settle down on food to which they have been accustomed, which is normally pasture. They should then be introduced to the rape gradually—for a few hours the first day and by the third day they can be left on with a run-off provided. If the lambs commence scouring, turn them on to grass, kale, or green feed, and feed them dry feed such as chaff. Do not feed the rape in large breaks, since much of the feed will thereby be spoilt before it can be consumed. If the lambs become lazy or sluggish towards the end of the fattening period they should be made to exercise.

Lately rape has been replaced to some extent for fattening lambs by edible lupins. These are grown where, owing to pests or growing conditions, rape is an uncertain crop, and also to supplement the rape. The most promising variety for fattening lambs is the sweet blue lupin, which produces a good yield of palatable herbage which can be fed at different stages, but which will provide the greatest amount of feeding value per acre at, or just before, the flowering stage.

The cast-off ewes can usually be finished off on volunteer white clover and other species growing in the stubble after grain crops have been harvested; soft turnips or kale which may be provided, or on second-growth rape. While the ewes are running in the stubble the pigs on the farm can also be let loose to glean the fields. Whilst the food is there they will not wander far, but they will need to be returned to the sty and pen as soon as supplies become inadequate.

When Pastures Dry Up

With the pastures drying up in many districts dairy farmers will be kept busy feeding soft turnips and maize to the dairy herd. This feeding should commence as soon as the pastures begin to dry up and the milk supply commences to decline. If the milk supply is permitted to drop to too great an extent before supplementary crops are available, full recovery will not be attained. Seasons with plentiful summer and autumn rains have shown the effect of a plentiful supply of first-class fodder and drinking water on production, and although supplementary crops will not entirely replace succulent pasture, they will go a long way to filling the gap. Dairy farmers who had adequate supplies of silage or other supplementary fodders last autumn managed to maintain production in spite of the dry season, and in areas suffering from dry conditions this autumn farmers should not hesitate before opening the silage pit for stock where the pastures are failing and where there are not sufficient quantities of supplementary crops to meet the shortage.

If supplies of separated milk become inadequate for feeding the pigs, supplementary crops will be looked to to fill the gap. Whilst skim milk supplies are reasonably plentiful farm crops will supply what is necessary and meatmeal and other bought meals and grains need not be used. Soon the maize will be in the green cob stage when it is a most suitable feed for the purpose, the pigs consuming the whole of the plant—the cob with the milky grain, the sugary stalk, and the green leaves; early-sown carrots, chou moellier, and silver beet will also provide food. Pigs also develop well on rape, if this crop has been sown for the purpose or for feeding other stock. A farmer may hesitate thus to dispose of root crops, which may, if left, produce larger yields for winter feeding. He will, however, note that animals which receive a check require much more food to finish them off later, and it usually pays to dispose of them before winter when feed is required for warmth as well as to fatten.

Management of Paspalum

ALL farmers from North Auckland will remember the time when much discussion took place on the value of *paspalum dilitatum.* For several years it was considered by many a "bad" grass and one which should be eradicated. There is no doubt that it can be either a bad enemy or a good friends to the farmer. Before proper steps were taken to control this grass it was responsible for limiting production on many farms in the far north.

The unchecked growth of paspalum in the summer and autumn soon eliminates competition from other pasture plants, including ryegrass and white clover, and after a few seasons of lax grazing these important species will no longer exist. No ryegrass means less feed from June till October. No white clover, except on rich flats, means a sod-bound condition of the paspalum, limiting its production and the production of any other components of the pasture which may survive. When the pasture reaches this state the production is very low and has resulted in some farmers leaving their farms.

Preventing Sod-bound Condition

The measures taken to prevent the sod-bound condition are simple, and attention must be paid at this time of the year to their operation. To obtain the best feeding value and avoid suppression of other species paspalum must be kept short, and if stock cannot keep it short, the mower must be brought into action. Burning short or tall growth of paspalum does more harm than good, because it destroys or damages clovers in the sward. Occasionally paspalum may be allowed to grow long enough for cutting for hay or silage. It should not be permitted, however, to go much beyond the leafy stage, otherwise the product will be inferior and the rye and clovers in the sward will be unduly punished.

CHRISTCHURCH

RAM FAIRS

STUD RAM FAIR, February 22, 1945.
FLOCK RAM FAIR, March 15 & 16.

Entries may be made through Christchurch selling brokers. Liberal prizes will be offered for single shearling of each breed at the Stud Ram Fair. Special entry to be made for prizes. Breed societies have added liberally to Association's prizes. Judging will take place afternoon preceding fair.

M. E. LYONS,
Secretary, Canterbury A. & P.
Association,
Box 296, CHRISTCHURCH.

Pastures which have reached a sod-bound condition should be ploughed and cultivated preparatory to sowing perennial rye and white clover or crops preliminary to establishment of perennial rye and white clover. The ploughing and cultivation will rejuvenate the sod-bound paspalum, which will grow strongly in competition with crops or in the sward that is established. Before sowing perennial rye and white clover the land should be given a dressing of phosphate and lime. If the sward is then managed properly as indicated above, a well-balanced, highly productive pasture will result.

If the sod-bound pasture contains a sprinkling of perennial rye and white clover, it may be improved by adequate topdressing, and better control of the paspalum in the summer. However, speedier improvement will result if the sward is disc harrowed and surface cultivated. If a reasonable seed-bed can thereby be attained, the improvement will be most quickly brought about by over-sowing perennial rye and white clover. The paspalum will not resume its original vigour so quickly from surface cultivation as from ploughing, which should be carried out wherever it is obvious that the other species in the sward are not worth preserving.

* * *

Damage from Fire

AT this time of the year, when in most parts of the country the pastures are dry, people travelling in the country and the farming population should be on the alert to prevent damage from fire. Uncontrolled fires cause a considerable amount of damage, and in some years hundreds of acres of native bush and exotic trees are destroyed. The fires are almost entirely due to carelessness through scrub fires or fires for boiling the billy getting beyond control, and sometimes are caused deliberately by unthinking or mischievous persons.

Farmers should therefore keep a careful watch on the farming operations in the dry summer and autumn months and warn strangers of the dangers which are liable to occur from camp fires and the throwing away of pipe dottles or cigarette butts. City dwellers often do not appreciate the danger of the combination of a slight breeze and dry growth and how quickly a fire can get out of hand. Country folk certainly are aware of the need for ceaseless vigilance, but are frequently careless because chances previously taken have not so far resulted in serious consequences.

Fire, in destroying ground cover, opens the ground to the washing action of rain. If repeated at frequent intervals, the whole of the topsoil may be removed or so much soil may be removed that the land becomes unproductive. The soil which washes away helps to silt rivers, causing flooding and other damage on the lower country. Fire has caused millions of pounds worth of damage in New Zealand as well as contributing enormously to its wealth. To obtain benefit and less harm from fire it is necessary to exercise ceaseless vigilance and teach others the need to exercise ceaseless vigilance in the dangerous months.

—*J. E. BELL, Land Utilisation Officer, Wellington.*

* * *

Haystacks

BY now most of the hay will be in stack or in bales, and, particularly if it is good-quality hay, attention should be paid to its preservation. There is danger from fire and from moisture. If a stack commences to heat, test the heat by forcing a pointed iron rod into the centre of the stack and leave it there. Withdraw the rod from time to time and test the heat by hand. If the rod is not too hot to hold there is no immediate danger of firing. If the heat is over 140 deg.F. action should be taken to prevent firing, which takes place at 300deg.-400deg. F.

To prevent firing windows can be cut into the centre of the stack or a piece can be cut right through the centre and restacked elsewhere. The safest plan is to turn the hay and build it anew alongside. There is more danger of large stacks firing than small ones.

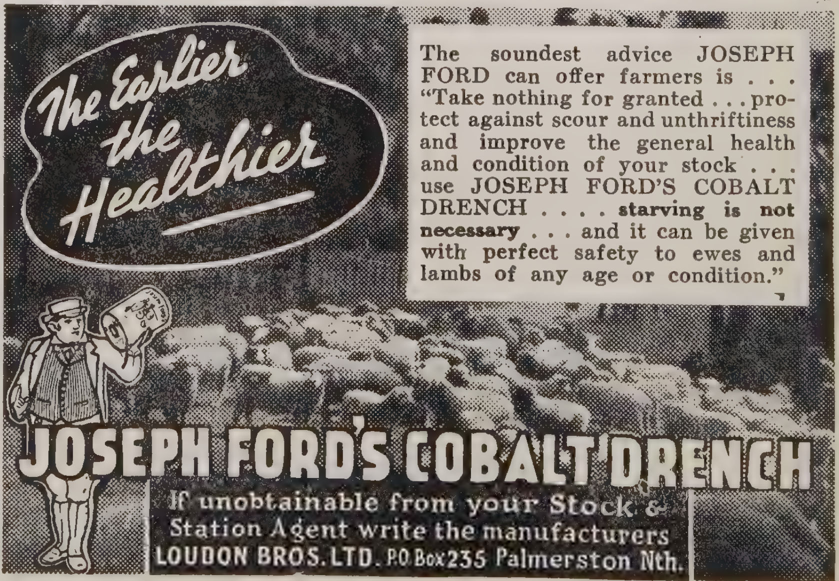
Protection from Weather

In addition to loss from firing through crops being harvested in too green a condition, thousands of tons of hay are lost every year in New Zealand through bad building and improper covering. Once having taken the trouble of growing the crop and cutting and harvesting the material, it is obvious that a little time spent in securing the stack from damage by rain is well worth while. In New Zealand the common type of cover is that made from fertiliser sacks, which are split open and sewn together. This cover will last more than once if it is soaked in a solution of 1 per cent. bluestone.

When covering stacks ladders should always be used, so that trampling on the haystack is avoided. If the stack is walked on, and particularly if this occurs near the eaves, water is liable to penetrate down holes made by trampling and spoil a considerable amount of the hay. As the stack sinks so must adjustments be made to the weights holding the cover in place.

Bales of hay should be stacked so that air can circulate freely and prevent undue heating through fermentation in the bales. If stacked in the open, they should be adequately covered to prevent rain penetration.

* * *



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Spraying and Pip Fruit Harvest

FREQUENTLY many growers make the mistake of discontinuing spray applications too early, with disastrous results in most cases. In districts where pests continue to be troublesome spraying should be carried on during February and March.

Care should be exercised in spraying in order to ensure a good coverage of fruit and foliage and to protect them against the ravages of these pests. Should red mite still be prevalent, a further application of summer oil 1-100 will be necessary, but a period of from 10 to 12 days' interval should be allowed to elapse between sulphur and oil sprays.

During hot conditions following showers, pip fruit should be kept under close observation for the appearance of a late infection of black spot, and where this is found immediate control measures should be taken. Lime sulphur 1-200 plus colloidal sulphur 2lb-100 has proved to be effective, but for trees which are in a debilitated condition and varieties having foliage liable to spray injury colloidal sulphur only should be used at a dilution of 4lb-100 gallons (25 per cent.).

In districts where ripe spot and bitter rot (*glomerella*) are troublesome the programme as suggested in the December notes should be carried out. One decided advantage with this spray is that it can be combined with summer oil where it is necessary to use the latter for the control of red mite.

Late varieties of peaches should be sprayed with a combination of lime sulphur 1-200 plus colloidal sulphur 2lb-100 for the control of brown rot.

Harvesting Pip Fruit

During the next three or four months harvesting of the pip fruit crop will occupy a good deal of the grower's time and attention. As so many skilled orchard workers are overseas with the fighting forces, or engaged in essential industries within the Dominion, growers should make arrangements as soon as possible to engage from the available labour a staff necessary for the handling of their crops.

Where necessary these orchard and shed hands should be given thorough instruction in the work they will be required to do during the harvesting season, whether it be picking, packing, or grading, and a strict supervision should be kept on the whole staff throughout that period. Much damage can be done by careless picking, and although it may not be very apparent at that time, it is often prominent by the time the fruit reaches the market. Inexperienced pickers are apt to pull the fruit from the tree, and this invariably injures the stem cavity, frequently resulting in rots at this point. If fruit is at the right stage of maturity for picking, it can easily be detached from the spur with an upward movement, without damage to fruit or spur.

In picking, fruit of approximately the same size should be selected, leaving the balance to size up for subsequent pickings. In this way a good deal of labour will be saved in grading and packing. With the temporary elimination of export and extra fancy grade, colour does not play a very important part, and so long as the fruit is at the right stage of maturity and carries the requisite amount of colour to qualify for fancy grade, it should be picked. The proper stage of maturity for picking can be determined by the change of ground colour of the fruit, the changing colour of the pips, and the readiness with which the fruit parts from the tree.

Grading

Grading is one of the most important operations in connection with the marketing of fruit, and a good deal of care must be exercised to see that the grading standards are maintained. The first consideration is the elimination of diseased, distorted, and badly-russeted fruit, or fruit with any other defects which would disqualify it for any of the standard grades. After this has been done, consideration should be given to the requirements for the respective grades. Even a small portion of inferior fruit is sufficient justification for rejection. A check-up of grading of fruit in the bins should be made periodically in order to see that the respective grades have not been allowed to get below the standard provided for in the regulations. Often a check-up on grading means the difference between getting fruit passed and rejection at the inspection point.

Packing

A good deal of care is required in packing to avoid bruising. The pack should be sufficiently firm to withstand the number of handlings required prior to reaching its destination. Angle packing is a common cause of bruising and should be discouraged. Irregular sizing is also the cause of a fair amount of bruising, but with a little sorting of fruit in the bins by the packer this can be considerably reduced. All fruit should be packed on the pocket system; each layer should be consolidated as the case is filled and the ends pressed down to avoid bruising when lidding.

Green Cropping

The time has now arrived for the sowing of cover crops, and in most orchards these are essential, particularly in these times of restricted fertiliser allocations. Growers contemplating the sowing of cover crops should refer to the notes on the subject in the December "Journal."

—D. J. HOGG, *Orchard Instructor, Mapua.*

Scale Insects and Their Control

DURING the summer and autumn months scale insects are most active on citrus, and it is during this period that control measures are most effective. There are several species of scale insects that are serious pests of citrus if not effectively controlled, and to effect a satisfactory control with the minimum expense necessitates a full knowledge of the various species. All scale insects find sustenance by piercing the outer tissue and sucking plant juices from the host. Many species exude a sticky substance known as honey-dew, which lodges on the foliage, branches, and fruit, and in turn becomes the host of sooty-mould fungus, which is so detrimental to the appearance of the fruit.

Following is a brief description of the six species believed to be most troublesome in citrus orchards in New Zealand.

1. **Red Scale** (*Aonidiella aurautii*).—A circular, flattish scale slightly larger than a pin's head, dull red to brown in colour, and turning greyish with age. This is the most troublesome of all scale insects on citrus, and is common in all citrus-growing districts. It is also the most difficult to control. No honey-dew is produced.

2. **Olive Scale** (*Saissetia oleae*).—The shape is oval to circular and flattish when young, but becomes raised when reaching maturity. The colour is brownish changing to black. This species, in all stages of development, is readily identified by a raised mark-

ing in the form of the letter "H." The adult is slightly smaller than a ladybird. Copious supplies of honey-dew are produced.

3. Hemispherical (or brown) **Scale** (*Saissetia coffeae*).—Similar in size and shape to the olive scale, but with a smooth shell, and is a light brown colour.

4. Circular-black Scale (*Chrysomphalus rossi*).—The shape and size are similar to red scale and the colour is black. This species seldom attacks lemon trees and is not present in certain citrus districts.

5. Hard Wax Scale (*Ceroplastes sinensis*).—The young are pure white, but soon develop spots which give the insect a star-like appearance. It is more or less circular, and in the adult stage has a diameter of about one-eighth of an inch and is covered by a hard, waxy shell. The colour of the adult is a dirty white. Honey-dew is produced.

6. Soft Wax Scale (*Ceroplastes destructor*).—This recent introduction is an uneven circular shape, having a diameter of ½-inch or more when fully developed. The colour is snow white and so the insect is most conspicuous. It is covered with a waxy coating the consistency of butter. This pest is believed to be confined to a relatively few orchards in one district only. The appearance of soft wax scale in other areas should be immediately reported to the orchard instructor for the district.

Control Measures

Control of all scale insects on citrus is best secured by spraying with a certified brand of summer spraying oil. The dilution can be varied according to the species to be controlled. For olive, hemispherical, and hard wax scales a strength of 2 per cent is advised, although 1½ per cent. will at times give a satisfactory control. However, to secure a good control of red, circular-black, or soft wax scales it is essential that a 3 per cent. dilution be used.

The number of spray applications required varies with the degree of infection and thoroughness of the application. Where trees are moderately open and good spray coverage is secured the sprays will be much more effective than where the trees are dense with foliage. To secure effective control of any of the species numbered 1, 4, or 6 above, the first application should be made in the early half of February. If infection is severe or soft wax scale is present, this application should be repeated from four to six weeks later. Where the infection is light and there is no soft wax scale the second application can be delayed until the end of April, which is the most effective time to spray for the control of hard wax scale.

Hemispherical and olive scales breed throughout the greater part of the year, consequently sprays can be applied at any period with good results. Where Bordeaux mixture sprays are being applied for the control of verrucosis and there is a light infection of one or both of these scale insects it is advisable to add 1½ per cent. of summer spraying oil to the mixture, thereby avoiding the necessity of a double spray application.

Budding

Citrus can be budded at any time when the trees are growing freely. However, best results can be expected from buds inserted in the autumn. Buds for propagation should be selected from rounded, more-or-less horizontal growth made during the previous autumn. As soon as the bud-wood has been selected the foliage should be removed to prevent loss of moisture through transpiration. The bud-wood is then wrapped in a wet cloth until required.

Trees to be budded should be pruned immediately prior to the operation by removing all branches and twigs likely to hinder the work of the operator. Further cutting back of the tree is best delayed until the spring growth commences. Branches selected to receive the buds should be as young as possible, provided they are at least the thickness of a lead pencil, and should be suitably spaced to make a uniform tree.

—*P. EVERETT, Orchard Instructor, Kaikohe.*

Packing of Citrus Fruits

THE Price Tribunal, Wellington, has communicated with the Citrus Council (Incorp.) in connection with the packing of citrus fruits. Under the present arrangement, where ceiling prices for wholesale buying are fixed on a per case basis and retail prices are fixed on a per pound basis, retailers are finding that they are losing money when they buy cases which are short weight. For the last few months numerous complaints have been lodged with the tribunal (from all over the North and South Islands) about the short weights in the supply of grapefruit, sweet oranges, and Meyer lemons.

A thorough investigation of these complaints has been carried out, with the result that the council has been informed that unless some remedial measures are put into operation immediately, the tribunal will be forced to make operative a wholesale ceiling price on a per pound basis instead of the existing per case basis. We think all growers will appreciate that such a step would not be in the interests of the citrus industry. According to figures supplied to the council, variations in the weight of fruit are as under:

GRAPEFRUIT—
Range from 32¼lb. to 49¼lb. per bushel box.
Range from 16lb. to 22lb. per half bushel box.

SWEET ORANGES—
Range from 39¾lb. to 42¼lb. per bushel box.
Range from 16⅓lb. to 22lb. per half bushel box.

MEYER LEMONS—
Range from 15½lb. to 18lb. per half bushel box.

The retail selling price is calculated on the assumption that a bushel case contains 42lb.

The council executive has considered the matter, and feels that all commercial growers should be acquainted with the position.

IT IS HOPED THAT A GENUINE EFFORT WILL BE MADE BY ALL CONCERNED TO IMPROVE THE PACK SO AS TO AVOID THE NECESSITY OF ANY AMENDMENT BEING MADE TO THE PRESENT WHOLESALE CEILING PRICE.

◆

Measurement Tables.

Units of measurement may be converted by the following simple table:

Ins. to cms.	Multiply by	2.540
Yds. to metres	„	.900
Miles to kilometres	„	1.600
Sq. ins. to sq. cms.	„	6.450
Cub. ins. to cub. cms.	„	16.400
Grains to grams	„	.065
Lb. to kilograms	„	.450
Cub. ft. to cub. metres	„	.030
Cub. yds. to cub. metres	„	.760
Cms. to ins.	„	.400
Metres to yds.	„	1.100
Kilometres to miles	„	.620
Sq. cms. to sq. ins.	„	.155
Cub. cms. to cub. ins.	„	.060
Grams to grains	„	15.400
Kilograms to lb.	„	2.200
Cub. metres to cub. ft.	„	35.300
Cub. metres to cub. yds.	„	1.310

One cord of firewood measures 128 cub. ft. and is generally placed in a stack 8 ft. long by 4 ft. wide by 4 ft. high.

HOME GARDEN NOTES

Work for February

DURING February tomato plants will be looked upon as bearing the most important maturing crop of fruit in the home garden. February is a critical period of tomato plant development, as the entire crop may be lost almost overnight.

Tomatoes Need Attention

With dwarf varieties which have spreading, dense foliage, there is the ever-present danger of an attack of "late blight" following heavy rain and during subsequent warm, humid conditions. This particularly applies where spraying has been neglected, or where it has been indifferently carried out. Tomato varieties which are staked are not immune from blight attack, and these must also be sprayed. Complete protection of the plants, however, can be secured only while all the foliage is coated with Bordeaux mixture.

In addition to spraying, pruning and tying should be attended to. Plants permitted to become bent are difficult to straighten up again, and there is always the likelihood of the stems breaking when fastening is taking place.

During February, in most tomato-growing districts, rainfall is invariably uncertain and erratic. Under these conditions regular watering is necessary to prevent the loss of fruits, especially on the first and second trusses. This is due to the development of a fruit disorder called blossom-end rot, and is mainly brought about through irregular watering.

Two insect pests which are very destructive to the plant and the fruit may be here referred to; these are tomato stem borer and tomato caterpillar. The former bores into the stem, disrupts the food and water system, and ultimately causes the death of the plant. The latter eats the foliage and bores holes in tomatoes, sometimes destroying every fruit on a truss. To destroy these pests arsenate of lead (powder form) should be included in the Bordeaux spray mixture at the rate of 2oz to each 4 gallons. While spraying, the stem of the plant near ground level should receive special attention.

Spring Cabbage

Except in the Christchurch district and further south, seed for spring cabbages should be sown during February—January in the above-mentioned localities. This can be done in the usual way; but as soon as the young plants appear they must be sprayed with nicotine sulphate (1 teaspoonful to each gallon of water) or Paranaph, or dusted with derris, for protection against attacks by aphis. In the southern half of the North Island Flower of Spring is the variety usually grown; further north round-headed types appear to be more suitable for early planting.

Shallots

A well-grown bed of this onion species should now be ready for harvesting. Contrary to what might be generally supposed, the bulbs, if long keeping is desired, must be handled with care. Rough treatment causes bruises, which ultimately lead to secondary infection and rots during storage. When well matured, carefully harvested, and properly stored, shallots will remain in good condition until well on towards the end of the year.

Onions

When onion bulbs are required to mature properly water should be entirely withheld from them from now to harvesting. To obtain bulbs of long-keeping quality a dry autumn is necessary. Wet or moist conditions prolong vegetative growth, which is inimical to proper ripening. Bending the tops over in order to induce maturity is not recommended. The bulbs should be allowed to mature naturally. Thick-necked specimens should be removed and used when convenient.

Celery

In most districts February is the last month in which celery may be planted in order to obtain reasonable growth, and the variety preferred is Solid White.

Lettuce

Sow seeds now and the plants can be set out in March. These should mature before very cold weather starts. In southern districts planting in a sheltered part of the garden is advisable. Webb's Wonderful or Success can be recommended.

Winter Greens

As present indications do not appear to favour a plentiful supply of these vegetables, every effort should be made to ensure adequate supplies in the home garden. Throughout dry periods copious watering will be necessary, and the plants should be closely watched for the appearance of a bluish-purple colour round the leaf edges. If, or when, this condition is observed, nitrogen in some form must be supplied, and quickly. Nitrate of soda, a tablespoonful to 4 gallons of water applied as liquid manure, will be effective in restoring the plants to normal growth. A question has recently been asked concerning the removal of the cabbage-like head of the Brussels sprouts plant. Not until all the sprouts have been removed should this part be interfered with. It can then be used in the ordinary way as a green vegetable. If kale (borecole) is being grown, every effort should be made to carry it through to winter in good condition. As a winter vegetable there are few to equal it among

WORK FOR FEBRUARY

Sow late carrots, lettuce, silver beet, spinach, radish, peas, turnips, spring cabbage. Harvest shallots. Tie up staked tomatoes. Keep garden soil well hoed. Shift kumera runners to prevent rooting.

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those grown for domestic use. Its tender, succulent green blades are superior, during winter, to many cabbage varieties. As it is a tall-growing plant, earth should be pulled towards the stem when hoeing is being done. This will effectively brace it against high winds. The latter remark holds good also for Brussels sprouts.

Peas

Provided a late sowing of these has been made and the plants are several inches high, frequent mulching with lawn clippings will do much to assist in retaining the moisture content of the soil, thus preventing the roots becoming dry and hard. In dry weather periods mulching should not be understood to take the place of watering. A late sowing of dwarf beans may also be treated in a similar manner as that indicated for peas.

Pumpkins, Squash

The vines of these plants should not be permitted to grow unchecked. When they are 3 to 4ft long the tips may be cut off. This will lead to the development of extra laterals with the consequent production of more fruits. Marrows of the creeping vine variety should also be treated in the same way. These, however, are not recommended for the home garden. The "bush" types are best suited for growing on small areas of land.

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All gourds, particularly during very dry weather, are likely to be attacked by aphis. Spraying with nicotine sulphate or dusting with rotenone insecticide (derris) will destroy these pests. Manufacturers' directions for the use of these insecticides should be followed. Paranaph may also be used.

Asparagus

Where manuring may not yet have been done the bed should be thoroughly cleaned up and copiously watered, following which substantial applications of liquid animal manure should be made. For this liquid dressing the use of inorganic nitrogenous fertilisers cannot be recommended. If practicable, a mulch of seaweed or stable manure will be highly beneficial.

Endive

In districts where lettuce are difficult to grow a sowing of endive may be made. The plants can be used for salads in much the same way as lettuce, and will grow well during relatively warm conditions. A part of the garden from which potatoes have recently been dug will be suitable. Before levelling the ground a few handfuls of superphosphate broadcast and raked in will usually be sufficient fertiliser for the crop.

For best results fresh seed is desirable. In rows 12 to 15in apart the seed should be sown thinly, with shallow coverage, the plants being subsequently thinned to 12in spacing. Plants removed by thinning may be transplanted to another bed. In either case plenty of water must be supplied. To produce tender heads they should be blanched by tying the leaves together or covering the whole plant with a box, tin, or flower pot. No light should be permitted to reach the plant during the blanching period. Green Curled is the variety recommended.

Green Manure Crops

From the end of February areas of the garden may become vacant on which no newly-planted vegetable crop would mature before winter. Advantage should be taken of such opportunities to sow green manure crops with the object of maintaining the fertility of the soil. It is recognised that in many instances stable or farmyard manure is difficult to secure, and therefore it is necessary to resort to the expedient of growing cover crops which are ultimately dug in. These constitute the best substitute for the manure from the farmyard, and where intensive production is being carried on, whether in field or garden, advantage should be taken of every area of vacant land, large or small, to grow a green manure crop.

These green manure or soil-improving crops, as they may be termed, serve another very useful purpose while they are growing. It should be better known that, during periods of heavy rainfall, the plant food content of land unoccupied by a growing crop is subject to heavy leaching; that is, it is washed away through the subsoil and beyond the possible reach of the roots of vegetable plants. Green manure crops grown during this period prevent leaching of plant food, absorb it into their own structure, and in the decomposition which takes place after it is incorporated with the soil the residue, together with the humus formed, is left for the benefit of the consumable crops which follow.

The time when a green manure crop may be dug in will largely depend on when it is intended to grow the first vegetable crop on the occupied area. If the cover crop is a leguminous one, such as lupins, full advantage of its nitrogen-accumulating properties will not be obtained until it has reached its maximum growth. At this stage it may be too late to plant a very early spring crop. Oats, which do not collect nitrogen, will provide an abundance of green substance to dig in, and the necessary nitrogen can be supplied by broadcasting sulphate of ammonia, 1oz per square yard, before digging is started.

Whatever may be the variety of green manure crop grown, it should not be dug in just before using the area for a vegetable crop. Sufficient time should be allowed for the carbonaceous substance to be mainly decomposed before sowing seed or setting plants on the newly-drug ground.

—D. K. PRITCHARD, *Instructor in Vegetable Culture, Wellington.*

◆

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NOTES FOR BEEKEEPERS

Supplying of Young Queens

THE main honey flow is usually in full swing in most districts during the first two weeks in January. Where supers have already been filled and the combs are capped over by the bees they should be taken off the hives and extracted. The empty combs may then be replaced for the storage of any further incoming nectar. Although no definite figures are available, larger crops are secured sometimes by taking off this early sealed honey, and replacing the extracted combs, rather than by piling up the supers until the main flow is tapering off before beginning to extract, the reason being that the bees work much harder than usual when they find portions of the crop taken off and replaced with supers of wet combs. The replacing with dry drawn-out combs does not appear to have the same stimulating results.

When sufficient honey has been extracted to meet the expenses of spring management and supers have been replaced to take the balance of the crop, the beekeeper should turn his attention to something that will have an important bearing on the next season's crop, viz., preparation for the supply of young queens.

Purchase of Queens

Some beekeepers prefer to secure young queens from a recognised queen breeder. The following description of the types of queens offered for sale may be helpful to enable beekeepers to decide just what they should order.

Untested Queen.—This is a young queen that has been kept in the mating nuclei just long enough to prove that she has been mated.

Tested Queen.—This is a young queen that has commenced to lay and has been kept long enough to prove that the mating has been pure. In the case of a queen of Italian stock pure mating is indicated by the uniformity in the characteristic markings of the young emerging brood.

Selected Tested Queen.—This is a queen purely mated and which shows decided promise in the way she has commenced her egg laying.

Breeder Queen.—This is usually a queen that has been kept for a season and has proved her ability to produce a strong colony capable of bringing in a good crop of honey.

Introduction of Queens

When queen bees arrive through the post the cage should be carefully examined to see if the queen is alive and active. Queen breeders generally guarantee safe delivery and will replace any dead queens, provided the cage is returned intact.

The safest method of introduction is to make up nuclei as described below, but, instead of introducing a ripe queen cell, the cage containing the queen and her attendant bees is placed in between the brood frames with the gauze facing downwards. Once the queen has been accepted the nuclei may be united with a dequeened hive by means of a sheet of newspaper.

In order to facilitate the work of queen rearing nuclei colonies are used. In these small colonies queens can be raised and cared for until they are mated and laying. It is an easy matter once the queens are laying to transfer them to larger colonies. In this way no old queen is destroyed until the beekeeper is sure he has a young laying queen as a replacement.

Type of Nuclei

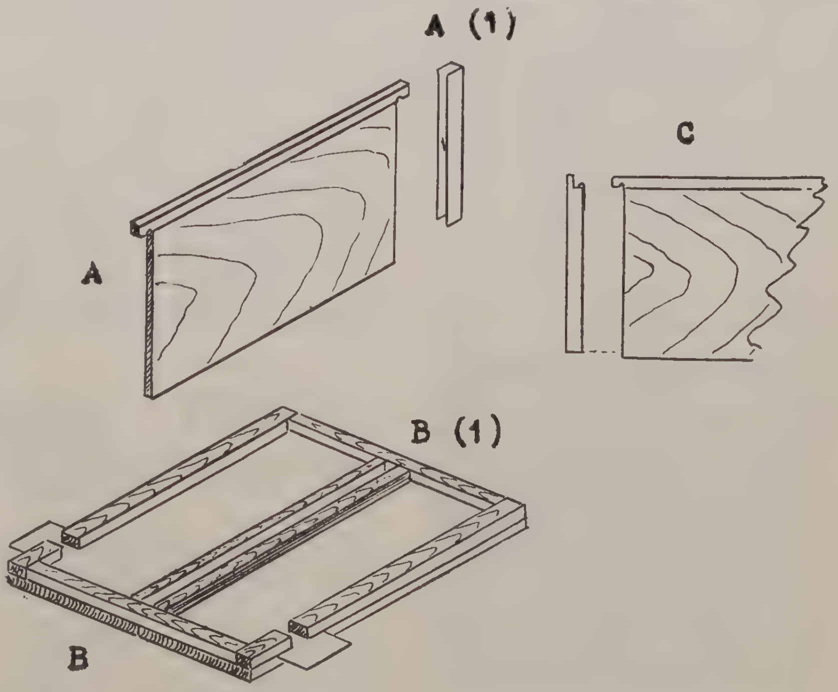
The independent 4-frame nucleus hive for years past was the main type of equipment used. To reduce the amount of extra equipment down to a minimum, many beekeepers are now using the standard super with a division down the centre, thus making two compartments that will hold 4 frames each. The only extra equipment required is a division board and a light separating or floor board.

Division Board

This is shown in A, and can be made of ½ in. timber to just slip easily down the centre of the super. The width of this board should be sufficient to allow it to protrude below the bottom of the super and fit in the recess B (1) on the floor board. When the division board is in place there is no possibility of bees getting through from one compartment to the other. A (1) is a guide made of tin that can be nailed on each end of the super to allow the division board to slide in, and also makes doubly sure of no bees getting through. A strip of wood may be nailed on to the top of the division board so as to fit snugly into the rebate. Where metal rebates are used a notch may with advantage be cut out of this bar as shown in C.

Divided Floor Board

This is made of two pieces of ½ in. board with the join preferably down the centre, so that, should any shrinkage occur after assembly, the opening will be covered by the division board. Rims of ½ in. strips are nailed round the four sides as shown, with a small opening of about ¾ in. on either side. A small piece of galvanised iron let



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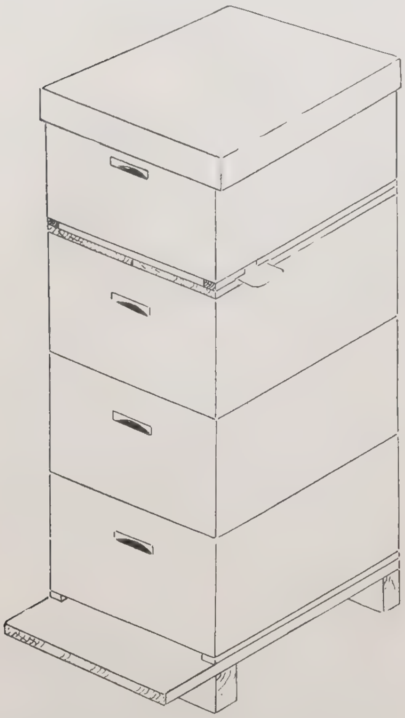


in under these strips as illustrated acts as a suitable alighting board for each division or nuclei. The two strips of wood in the centre are spaced to allow the division board to fit in easily, thus ensuring a bee-tight compartment.

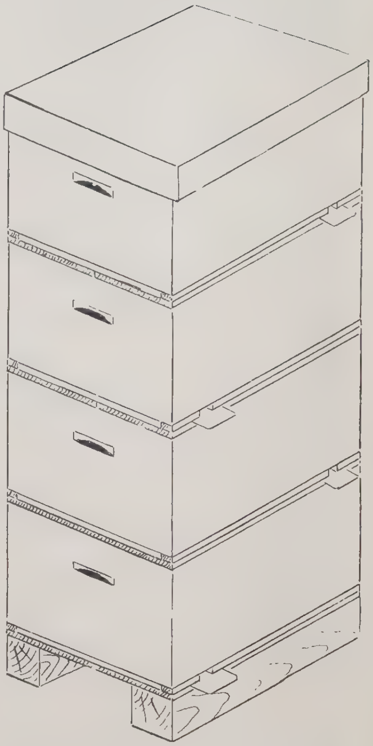
Making Up Nuclei

In queen rearing and work of this nature sound planning leads to smooth and efficient work. Queen cells should be started with some thought to the day on which they are due to be distributed. Weather conditions may be unfavourable when the cells are due to be distributed, therefore it is wise to be prepared beforehand, as nuclei are best stocked with young bees. A good plan to follow at the time queen cells are checked over is to transfer the required number of frames of capped brood above queen excluders, placed over several strong colonies. There is no need to look for the queen, but just brush off the bees, and place 7 or 8 combs of brood above the excluder in each case. Nurse bees from below will come up through the excluder to attend to any uncapped brood placed above. By the time the nuclei are ready to be made up the supers above the excluders will be well stocked with young and also hatching bees. Should the weather be adverse on the 10th day after grafting the cells, it is possible using the above method quickly to make up the nuclei, by placing in each division one or two frames of brood and adhering bees from these prepared supers, at the same time carefully pressing in a queen cell somewhere near the centre of the brood. If conditions will allow, have a quick look over each brood comb, and destroy any queen cells that may have been started. Complete each nuclei by the addition of a frame of honey and an empty drawn-out comb. A piece of green grass may be pushed into the entrance to check the drift of bees, but it will be found hardly necessary if the above procedure has been followed. Taking the nuclei to another site several miles from the apiary in which they were made up will also overcome excessive drift.

Disposition of Twin Nuclei

The placing out of the nuclei can be done as shown in D over an established colony, or a bank of nuclei can be made up as shown in E. This latter system works quite well, as the nuclei do not have to be disturbed very often, but care must be taken to see that the alighting boards are replaced correctly in their respective positions. When queens are mated and laying they can be used to replace some of the older queens in the apiary.

E



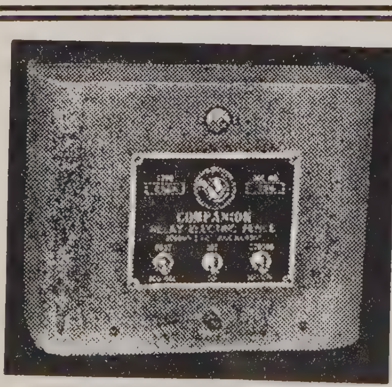
Conclusion

Mastery of the technique of queen rearing will ensure a supply of queens for the making up of nuclei, while the establishment of nuclei ensures a supply of young queens, which play such an important part in successful commercial beekeeping.

C. R. PATERSON, Apiary Instructor, Hamilton.

Vegetable Growing.

Practical advice and sound information on how to get assured vegetable results are contained in "Vegetable Growing in the Home Garden," by D. K. Pritchard, which is available at 6d. a copy (post free) from offices of the Department of Agriculture.



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DEPARTMENT OF AGRICULTURE

NOTICE TO BEEKEEPERS.

The attention of beekeepers is drawn to Regulation 6 of the Apiary Registration Regulations, 1937.

Under the above regulations it is incumbent upon all beekeepers to notify the office of the Director of the Horticulture Division, Department of Agriculture, Wellington, not later than 31st December each year, of any increase or decrease, as the case may be, in the number of hives kept at each registered apiary on 1st December of that year.

Every person failing to comply with the requirements of the regulations is liable on conviction to a penalty not exceeding £20.

Those beekeepers who have not yet attended to this matter are now requested to do so as soon as possible, to enable the apiary register to be brought up to date.

W. K. DALLAS,
Director of the Horticulture Division.

POULTRY KEEPING

The Food Shortage

ALL poultry producers are now aware of the severe shortage in supplies of poultry foods and of the reason for it. The hard fact must also be faced that this shortage will continue throughout this year at least, and may easily persist in a lesser degree for a further period.

Steps are being taken by the Government to alleviate the position as far as possible, while a determined effort will be made to effect an even distribution to poultry-farmers of the food which is available. Individual poultry-farmers can assist considerably in this latter direction by closely supporting any scheme which may be put into operation to bring about an equable distribution of the essential poultry foods. Unless assistance is given in this direction, some may profit at the cost of others, even to the extent of putting some of the latter out of business altogether. Control in the matter of supplies is usually irksome to purchasers, and entails much work and many difficulties for those responsible for effecting a control upon which may depend the very livelihood of many. The help of every poultry-farmer is sought in this connection.

Alternative Foods Short

Unfortunately, at a time like this, when supplies of pollard, bran, wheat-meal, and meat-meal are not available in quantities sufficient to satisfy the industry, there are all too few alternatives to which the poultry-farmer can turn. The average poultry-farmer generally has neither the land nor the labour for the growing of crops suitable for supplying foods to augment those now available to him. On the other hand, most farms have an area set aside for the growing of green food. This area should be cultivated to the limit, and ample supplies of green food fed to the birds. While it cannot be claimed that green food can entirely replace the food now unobtainable, good supplies will help to bulk the food and assist in maintaining health at a time when poor-quality foods may have to be used. This is an important fact, and should not be overlooked.

Limited supplies of ground oats, linseed-meal, copra-meal, peas, linbran (linseed bran), and other foods not normally used by the average poultry-farmer will doubtless become available. The cost factor in each case will be seriously considered, but may have to be disregarded in some cases in order to tide over a difficult situation. Most unfortunately, barley and barley-meal will be in short supply, while the increased acreage of maize sown this season will be insufficient materially to assist the situation during the next rearing season. There is, however, a much-increased acreage of potatoes this season, and these may well assist during a difficult period. Though not normally used, potatoes are an excellent source of carbohydrates (starch), and have been used largely in the United Kingdom to eke out the strictly limited ration of meals in that country. They should be boiled and included in a wet mash—up to 20 per cent. of the whole, by weight. Difficulties will be incurred with the use of boiled potatoes in avoiding a sticky or tacky mash. Much will depend upon the coarseness of the meals used in the mash, and discretion must be used accordingly in regard to the quantity of potatoes included. Dairy-farmers with flocks will be better placed, as good use can be made of dry curd and green food. (An article on feeding curds to poultry appeared in the December number of the "Journal," and a leaflet on the subject will shortly be available from the Department of Agriculture at any of the main centres). Others who are able to obtain supplies of skim-milk would do well to consider this system of feeding as a means of tiding over the present shortage. Soaked wheat is another method of feeding available to those with adequate supplies of wheat, but this system, although eminently satisfactory, cannot be advocated generally, since the probable supplies of wheat will be insufficient to meet any greatly-increased demand such as would occur if large numbers of poultry-farmers changed over to soaked grain feeding.

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It's great stuff to get you two eggs where only one was laid before. Keeps birds in a steady and healthy laying condition . . . contains all those grain-meals, and other meals necessary for a top-grade poultry mash . . . saves time. It's a tedious job mixing mashes yourself. Try a bag—17/6 per bag, ex store, Auckland; 18/- per bag on rail or boat, Auckland.

Bran & Pollard: Send us details of your poultry registration receipt and we will arrange regular supplies from the Wheat Committee. **There is no need to go short of bran and pollard. Tell us what you want—we will tell you how to get supplies.**

Stocks held of: Wheat, Maize, Meatmeal, Linseed Meals, Calf-meals, Hay, Straw, Molasses, Meatmeals, Grits, Pig Concentrates, Dairy Ration, Etc., Etc.

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Conserve Foodstuffs

It would seem almost unnecessary to stress the need for conserving the available supplies of foodstuffs, but waste often occurs on poultry-farms. This waste may occur in vermin-infested food-stores, where dry mash is fed in faulty dry mash hoppers, or where the careless feeding of grain in litter leads to quantities in excess of the birds' requirements being given. A number of poultry-farmers who have expanded their plants have been forced to use 2in wire-netting in front of the laying- and brooder-houses. This netting, of course, permits sparrows to enter the house and take food. It is regrettable that adequate supplies of ⅜in netting are not available, but if fresh supplies are landed from overseas, these will be distributed and released as rapidly as possible.

Cull Unproductive Birds

Systematic and consistent culling is always a sound policy, and is a means of saving money. Unfortunately, for a number of reasons, the practice of culling stock of all ages is not carried out to the extent that is desirable on the average poultry-farm.

Today the culling of all unproductive, unthrifty, or surplus birds is a first duty of every poultry-farmer. This may easily be the most important method of avoiding an enforced reduction in poultry flocks generally.

Every bird of the type mentioned is robbing the productive bird of essential foodstuffs. Not only is systematic and consistent culling the most effective method of conserving our limited food supplies, but it is the surest method of saving money whether there is a food shortage or not. How often this has been said and written, yet how few are the poultry-farmers who force themselves to benefit from carrying out an obviously sound economic policy! The present food shortage may well drive this fact home, and our flocks will benefit accordingly. It will be useful to look at the types of birds which may be culled, with obvious advantages, at the present time. They may be described, briefly, as follows:—

1. **Any unhealthy bird, whether male or female.** Such birds are wasting food, and are a menace to the remainder of the flock. Cull the bird with a yellow comb, the bird with an elongated head and sunken eye, the obviously anaemic bird, and the undersized runt. Any bird obviously lacking in constitution should go.
2. **The early-moulting pullet.** The odds are that the bird is a low producer, and quite unfitted for next season's breeding or laying pen. No yellow-fleshed laying bird (excluding those reared this last season) should be showing heavy yellow pigment in the legs at this season of the year. It is almost certain to be a low, or non-producer, and must be culled to save food.
3. **Cockerels surplus to next breeding season's requirements**—allowing for reserves and selection—should be off the farm by now. They are eating valuable food required for laying birds and growing pullets.
4. **Cull without delay hens as they go out of production,** unless they are of particularly high quality and are required accordingly for next season's breeding pens. Many hens run to fat, and are slow producers. There is no justification for retaining these under present circumstances. Save the food they would eat for high-producing pullets, which are now coming to the laying stage.

Time spent upon wise culling will be time well spent during this year. Difficult times have to be faced, but all can help by culling their flocks. Don't leave it entirely to the Government and others to assist you—help yourself; by so doing, the general food position will be improved.

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Health of Poultry

To recognise disease in the early stages and to know how to maintain the health of birds is essential to successful poultry keeping. The following **free bulletins** may be obobtained from the Department of Agriculture, Wellington, Auckland, Christchurch and Dunedin: "Internal Parasites in Poultry," "Coccidiosis in Poultry," and "Pullorum Disease, or Bacillary White Diarrhoea of Chicks."

Lincoln College Old Students' Scholarship

This Year's Candidate Selected

FOR some years the Y.F.C. Federation has been indebted to the Old Students' Association of Canterbury Agricultural College for a half scholarship tenable at Canterbury Agricultural College, Lincoln; this has so far been available to Y.F.C. members in the South Island only. This has now been increased to a **full scholarship**, to the value of £55, and is now available, annually, to active members of Young Farmers' Clubs in both islands. This is a very concrete demonstration of the interest taken in our movement by the Lincoln College Old Students' Association, and our thanks are due to that body for its generosity.

The scholarship is tenable at Lincoln in any one of the following courses:—

(a) **The College Diploma Course.**

(b) **The Intensive Eight Months' Course.**

(c) **The Rural Valuation and Farm Management Course.**

Applications for this scholarship were recently called, each club being allowed one nomination, through its local district committee. District committees, in turn, were asked to make one selection each from the club applications, and to forward them to headquarters for final decision by a selection committee set up at the last annual general meeting of the federation. The committee consisted of Messrs. L. J. Wild (Feilding), A. C. Cameron (Dunedin), and S. Freeman (Dominion Organising Secretary).

The number of applications (six) was disappointing. Many clubs, however, wrote expressing their gratification that the Old Students' Association had extended both the value and the scope of the scholarship, and while regretting that the amount of work on most farms at the present time prevented their members from seeking to take advantage of the opportunity offered, stated that the matter would be definitely kept in mind for the future.

The first candidate for the scholarship selected by the committee is William Keith Marriott, a member of the Flaxbourne Young Farmers' Club, Marlborough. He was 17 last May, and his educational qualifications include three years at secondary school, where he gained his school certificate and passed Public Service and University Entrance examinations. His farming experience consists of two years on mixed farms, with a year's training at the Flock House Farm of Instruction, Bulls. He also took the A.T.C. correspondence course in 1943-44. Whilst at Flock House he was a good influence among the other lads, and gained the reputation of being a good worker, being diligent, reliable, and trustworthy, and very keen to acquire knowledge. He is considered to be the type of lad who will benefit considerably from his course at Lincoln College, and one who will uphold the ideals of the Young Farmers' Clubs organisation.

Members throughout the Dominion will join with us in extending the heartiest congratulations to him, and in wishing him every success.

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Field Day at Oxford

By A. W. Harris, reporting secretary, Oxford Y.F.C.

A SUCCESSFUL field day was held recently by the Oxford Young Farmers' Club; there was an attendance of 25 members, together with local farmers and visiting friends. Visits were made to various farms in the district and other places of interest, and our thanks are due to Mr. E. G. Smith, of the Department of Agriculture, who conducted the party around.

The first visit was to Mr. A. Cross's farm, where a successful autumn sowing of linen flax was seen, also two very good permanent pastures and a paddock of subterranean clover. The effects of lime on the subterranean clover on light land were clearly shown.

At the linen flax factory, the running of the factory and the processing of the flax were explained by Mr. Cresswell, the manager.

On Mr. H. C. Urlwin's property a good example was given in the cowshed and feeding stalls of what can be done with concrete on a dairy farm.

The first crop of swedes saved for seed in the Oxford district was inspected at Mr. Roak's farm, and created great interest.

Experimental plots demonstrating the effects of lime and chalk were seen on Mr. Gorton's property, where a paddock of the new short-rotation ryegrass also aroused interest.

On Mr. A. Townsend's farm an excellent pasture of perennial ryegrass and white clover was seen on a fairly poor type of soil.

The field day proved of great value and interest, and we take the opportunity to thank those who gave permission for the club to visit their properties, and all those who assisted in every other way to make the field day a success.

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Five Rivers Club Social

By T. J. Malone, hon. secretary, Five Rivers Y.F.C.

THE Five Rivers Club recently held a social evening in the local school, which attracted a good attendance of relatives and friends.

The prize-winners in a euchre tournament were Miss Gibson and Mr. R. W. Muir in the ladies' and men's sections respectively.

After supper a debate took place between two teams selected from the junior members of the club, the subject being, "That Town Life Offers Better Opportunities for Advancement than Country Life." The teams were as follows:—Affirmative, T. Malone (leader), T. R. Thomson, and A. E. Muir; negative, D. G. Muir (leader), F. Moore, and B. Hamilton. Mr. G. A. Hamilton acted as judge, and after an interesting contest gave the decision, by a narrow margin, to the negative team. At the conclusion of the debate Mr. W. King, chairman of the Western Southland Y.F.C. district committee, spoke on the Young Farmers' Clubs movement and its general activities.

A dance followed with music by Miss J. Drummond, and several vocal items by Miss King. Novelty dances were won by Miss M. Gibson and S. Gibson, and by Miss M. Muir and A. E. Muir. J. Hamilton was M.C.

The social was an outstanding success, and the club funds will benefit by over £8.

◆

The weight of a cubic foot of roots in a clamp or pit is as follows:—Turnips, 33 lb.; swedes, 34 lb.; mangolds, 35 lb.; carrots, 31 lb.; parsnips, 31 lb.; potatoes, 42 lb.

Care & Maintenance of Farm Machinery

By Mr. V. W. Fullerton-Smith.

(Main Points From Talk Given to Marton Club on November 10, 1944, Prepared by Malcolm F. Gray, Hon. Secretary, Marton Y.F.C.).

IN the first place, the speaker emphasised, the whole question of the care of farm machinery is an economic one. At a very conservative estimate, and counting a tractor at £500, the farmer today, with only the essential implements, has an outlay of well over £1000 in machinery, and consequently it is highly desirable to use the utmost care to keep depreciation at a minimum. This is quite apart from the pride in possessing clean and efficient machinery.

The whole field of farm machinery was covered, from the tractor to the konaki, from the plough to the hay sweep. Lubrication was the main item throughout, though the abuse of machinery was strongly condemned.

So don't stint lubrication—do it thoroughly; no damage is caused by too much, but too little is disastrous. Never on any account use spent oil on any moving parts, except such things as ratchets. Use the best oil —it is not expensive and pays in the long run. Good oil cans are not cheap, but are a very sound investment—always have one and use it freely.

A good plan is to keep a tin of spent oil and a paint brush handy and go over each implement before putting it away—in a shed if possible. Even the manure boxes of drills and topdressers can do with a coat when put away. This ensures that the stars, etc., are kept in first-class order.

The tracks of a crawler tractor require very careful attention, and the engine should always be checked—oil each time it is started up. Rough ground can often turn the oil tap, and half a minute lost in a check-up is not wasted if it avoids run bearings, which are likely to bring in heavy repair bills.

One point about ploughing with rubber-tyred tractors—don't run two wheels in the furrow; hitch the drawbar so that all four wheels are on the land. The going is much easier and the saving on petrol is considerable.

The plough is the most important implement, for if the land is not ploughed properly, it is little use trying to sow a crop. Keep the mouldboards clean—use the brush and spent oil at the end of each day and before starting; at the beginning of each season dismantle the wheels and clean the bearings thoroughly; and remember that by speeding you stand a good chance of bending your plough.

The bearings of the discs must be lubricated liberally; they have to stand up to far greater strains than many people realise. Always turn wide to avoid bending, and don't forget the spent oil when the job is done. Keep the boxes of the drill clean at all times—and don't travel any further than possible before starting to sow, with the boxes full. Mr. Fullerton-Smith instanced the man who filled up his 17-coulter drill with seed (peas) and manure, took it down the road, out into the paddock, and straight away let in the clutch, and wondered why the whole "innards" dropped out!

Hay mowers cannot have too much attention, especially the cutter bar. See that the knife clips are doing their job —and don't speed; thrashing a mower invariably means expensive replacements—expensive in money and time. Always keep separate knives for topping and thistle cutting, and don't spare the spent oil before putting the machine away. Keep a crescent spanner in your pocket and don't forget to use it. This also applies particularly to the tedder, which is **not** made for speed.

The hay press, when properly looked after, should last a lifetime. Empty it out when finished, and use the oil brush along the inside edges. A chute to make the press build its own stack saves much time and sweat. It is a simple matter to knock one up.

In the shearing shed be wary about making adjustments to the overhead gear unless you are an expert. Use thinner oil than that usually supplied —it travels through wicks and fine tubes more satisfactorily; plenty of oil is no disadvantage. Don't grind combs and cutters unnecessarily: flying sparks may look business-like, but it is far from economic practice. Don't stint the emeries—well-ground gear justifies a new emery. Finally, always study all instruction books carefully, and keep them where they are safe and easily found for reference. They are essential for ordering replacements.

◆

Bulletin No. 193, Ropes, Useful Knots and Splices, is available free from the Department of Agriculture.

WANGANUI DISTRICT FIELD DAY. *Left*—Mr. M. D. Murray, Woodville, demonstrating on a dairy cow. *Right*—Southdown sheep being let out of pen after a demonstration by Mr. A. C. Vile, Tutaenui, Marton.

Distinguished Airman

Y.F.C. ENTHUSIAST'S RETURN

WING Commander W. R. Kofoed, D.S.O., D.F.C., who from its inception was a leading member of the South Taieri Y.F.C., has recently returned to New Zealand after a distinguished career overseas. He is now commanding officer of the R.N.Z.A.F. Station, North Taieri, and all those who know him are glad to see him back again in his home district.

Wing Commander Kofoed enlisted in the R.N.Z.A.F. early in the war, and received his initial instruction at the station he now commands. After completing his training as a pilot he left New Zealand in July, 1941, serving in Great Britain and the Middle East. He participated in two attacks on the German warships at Brest, and later completed two attacks on the enemy naval base of Trondheim from a very low level in the face of intense anti-aircraft fire. Later, in the Middle East, he continued to be an inspiration to his squadron, and for his gallant service he received the D.F.C. in February, 1943.

During his second tour of duty he attacked the targets of Palermo and Catania, and took part in flights over the battle areas during the Tunisian campaigns. In one sortie over Palermo his aircraft was severely damaged through the explosion of a photo-flash in the fuselage, but he safely returned it to base by superb handling, even though the flight was one of eight hours' duration. That feat, added to his qualities of leadership, earned him the D.S.O. on October 15, 1943.

Wing Commander Kofoed returned to New Zealand on May 16 of this year, but retained the acting rank of squadron leader. He attended the Central Flying School at Tauranga, and later, in view of his distinguished career and proved qualities of leadership, he was appointed commanding officer at Taieri, with the rank of wing commander.

Otorohanga Field Day

By G. L. CLARK, Hon. Secretary, Otorohanga Y.F.C.

THE shortage of petrol and the unsettled weather were two big factors which prevented a larger attendance at the field day on October 28 on the farm of Messrs. Tipping Bros. In spite of this there was a muster of between 50 and 60 Y.F.C. members and friends. Nine members from as far as Te Anga represented the revived club in that district. Paewhenua Club was also well represented. Hearty thanks are due to our advisory president, Mr. Noel Tipping, for his efforts and generosity, which helped in a large measure to make the day a great success.

The chairman, D. Robertson, welcomed those present. A demonstration of killing and dressing a sheep was given by Mr. A. J. McCready, who showed many innovations he had introduced through long experience, which improved the look of the carcase and shortened the time of doing the work. The care of the skin was a matter emphasised by Mr. McCready. He demonstrated his way of drying a skin and pointed out how money can be lost by careless drying.

A post-mortem examination on a facial eczema infected sheep was carried out by Mr. Kemp, stock inspector, Te Kuiti, who described the functioning of the internal organs and the symptoms associated with common diseases, making particular mention of hydatids. In all the diseases Mr. Kemp stressed the fact that "prevention is better than cure."

Mr. Murray Pratt next gave an exhibition of fencing, explaining fully all he did and why. Much attention was focused on the way he footed strainers and posts without wire.

Mr. Robertson expressed appreciation to those who assisted in the success of the day, especially to Mr. Tipping for the use of his property. Mr. K. Montgomery, Y.F.C. district secretary, said how pleased he was to see such a large gathering, and referred to the educational value of field days.

A display of horse breaking, roping, and throwing was given by Mr. B. Hall, who had with him a quiet broken-in horse that stood patiently while he demonstrated. He emphasised that it was really a matter of "educating" not "breaking in" a horse.

Much interest was shown in a demonstration of shearing. Correct methods of blade-shearing were shown by Mr. A. G. Old, and Mr. W. McCormick shore several sheep by machine. Mr. Old claimed that during rough weather losses were less likely to occur in sheep shorn by blade.

Mr. Dean spoke on classifying wool and illustrated points a buyer requires to watch, also methods by which to improve low-grade wool.

As a mark of respect to the memory of Sergeant Pilot E. Brightwell, a foundation member of the club who was killed two days previously in an aircraft accident, those present stood in silence. Tribute was also paid to the memory of a member of the Te Anga Club.

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Reports on Club Activities

WESTERN SOUTHLAND.

Clinton.—Owing to the club's auditor, Mr. D. M. Davidson, leaving the district, Mr. John Brown, jun., of Wairuna, was appointed to fill the position. Arrangements for lecturer at next meeting, and for a visit to the Kaitangata Coal Mine. Impromptu speeches delivered by club members, after which an enjoyable social was held. Nine members present out of a total of 15.

SOUTH CANTERBURY.

Cannington.—Questions on farming subjects asked of each member in turn; the questions in most cases led to interesting discussion, and a very profitable evening was spent. Eleven members present out of 17.

MID-CANTERBURY.

Ashburton D.H.S.—Arrangements for visits to irrigation works and to the dairy factory. Suggestions for future meetings discussed. Prepared 5-minute speeches delivered by a number of the members, and impromptu speeches by others. Large attendance reported.

Hinds.—Team selected to represent the club in a debate at the Rotary Club luncheon; speakers, W. Taylor, D. Chisnall, and R. Cocks. C. Lill congratulated on winning the individual prize at the recent inter-club stock-judging contest. Decided to purchase a trophy to be competed for by the junior members in a prepared speech contest. Interesting lecture by Mr. A. A. McDonald. Fourteen members present out of 20.

Methven.—Members to act as junior judges at the Methven A. and P. Association Annual Show. A mock meeting was held, the entire club acting as the Methven Trotting Club, E. Bryden and T. Callaghan taking the parts of chairman and secretary respectively. Mr. R. D. Robinson gave a very interesting lecture on "Seepage." Mr. T. E. Streeter, Y.F.C. Dominion President, was present, and gave a short address on the Y.F.C. movement and its activities. There was an attendance of 39 members out of a total of 75.

CHRISTCHURCH.

Christ's College.—Exhibition of films on "Soil Erosion" and other topics of interest to farmers, by Mr. Froude. Ninety-two members present out of 98.

NORTH CANTERBURY.

Oxford.—Interesting and instructive lecture by Mr. E. G. Smith, Department of Agriculture, on "Seed Certification"; the speaker dealt with the reasons for and the methods used in certification, and answered a number of questions. There were 16 members present out of 25. At a previously unreported meeting arrangements were made for a field day, and a dance committee was appointed, there being 21 members present on this occasion.

WAIRARAPA.

Masterton.—Arrangements for the Falloon short talk competition. The club's birthday party to be held, and also a field day in conjunction with the Boys' and Girls' Agricultural Clubs. An outstanding address was given by Colin Mackay, a returned member, who spoke on his experiences in the Pacific. There was an attendance of 35 members out of 65.

MANAWATU.

Apiti.—K. Nicholson appointed to position of assistant secretary, as present secretary, F. G. Mapson, expecting to be called for military service. Report by secretary on recent meeting of the Manawatu Y.F.C. district committee. Address by Mr. J. Marsdon, supervisor, Wellington Pig Council. Eighteen members present out of total of 34. At the previous meeting addresses were given by Messrs. S. G. Avery (chairman, Wellington council) and S. Freeman (Dominion Organising Secretary) on the Y.F.C. movement generally. Delegates to the Manawatu district committee were elected as follows: Active members, P. R. McKay and F. G. Mapson; advisory member, Mr. H. H. Jensen. Thirty members present.

Oroua Downs.—Miniature cup purchased by Mr. S. Boyden, vice-chairman, to be presented at the school calf-judging competition. Address by Mr. Orr, of Rongotea, on his experiences whilst in Crete. Sixteen members present out of 31.

Rongotea.—The following motion was passed at the meeting: "That this meeting of the Rongotea Young Farmers' Club expresses its very deep regret at the passing of its advisory president, Mr. H. J. Lancaster, and extends to Mrs. Lancaster and her family the very sincere sympathy of all members of the club; this meeting also places on record its appreciation of the very valuable services rendered by the late Mr. Lancaster to the Y.F.C. movement and to the Rongotea Young Farmers' Club since its inception." An address was given by Mr. I. Patton, manager of the Rongotea Dairy Co., on "Butter-making and the General Management of a Butter Factory." There was an attendance of 19 members out of a total of 25.

WANGANUI.

Hunterville.—Discussion regarding the holding of a sports tournament between the Mangaweka, Hunterville, Marton, and Bulls Clubs. Addresses were given by H. England and P. Rhodes on Romney and Southdown stud breeding respectively. Sixteen members present out of 25; also three visiting members from the Marton Y.F.C. Two new members enrolled.

Marton.—Secretary's suggestion of a newsletter to 11 members now on active service approved. Sub-committee appointed to inspect trees planted by the club in Centennial Park, Marton, in 1940. Club asked to supply associate judges and stewards for the Marton A. and P. Show. Mr. S. Freeman, Dominion Organising Secretary, who is acting as district secretary, was present in connection with the district efficiency contest. Talks were given by members as follows: G. E. Gordon ("Training Sheep Dogs"); K. H. Smith ("Romney Sheep"); K. G. Coles ("Beekeeping"). There was an attendance of 20 members out of 38.

SOUTHERN HAWKE'S BAY.

Ballance.—Report on recent dance; profit of £3 3s. An interesting address was given by Dr. Lange, of Pahiatua, who spoke on his impressions of the Middle East countries; his talk covered a period of nearly four years as R.M.O. with the 2nd N.Z.E.F. There were 17 members present out of 20.

Dannevirke.—One new member enrolled. Short report by the club secretary, J. L. Sunderland, on the recent meeting of the Y.F.C. Dominion executive committee held in Wellington. Vote of sympathy passed and letter to be written to the parents of the late Private R. J. Moore, who was killed on active service in Italy. Final of short talks by junior members, four finalists taking part; the judges, Messrs. R. J. Macdonald and C. R. Edgecombe, placed them in the following order: J. Lawes ("Rabbit Control"), 1; K. Brown ("Phosphates"), 2; M. Tickner ("Mole Draining"), 3; H. Allardice ("Footrot in Sheep"), 4. The judges commented on the high standard of all four talks. Messrs. R. J. Macdonald and C. R. Edgecombe both gave short talks to the meeting. Twenty-six members present.

TE KUITI.

Paewhenua.—An interesting evening was spent in discussions along novel lines, subjects being chosen, the affirmative being presented by one member and the negative by another. The speakers and subjects were as follows: "Stripping," R. Disher (affirmative) and C. Dean (negative); "Serpentine Super v. Superphosphate," K. Harnett (serpentine) and G. Morris (superphosphate); "Landgirls Should be Admitted to the Y.F.C.," R. Miller (affirmative) and G. Schultz (negative). There was an attendance of 18 members out of 21.

WAIKATO.

Cambridge.—Decided to hold a New Year's dance; arrangements left to dance committee. General discussion on farm topics. Twenty members present out of 60.

Okoroire.—Report on recent dance, showing net takings of £25 14s 11d. Account to be opened with Bank of New Zealand. Sum of £5 donated to local sports club. Arrangements for a field day on Mr. Peffer's farm. Club debate, the subject being, "That the Horse is Still the Most Economic Proposition on a Farm of 200 Acres"; the award was given to the team supporting the negative. Nineteen members present out of 33.

Te Awamutu.—Decided to set up a memorial fund, the proposed memorial to be considered in six months' time; the memorial to be in memory of local Y.F.C. members who have made the supreme sacrifice. A club debate was held, the subject being "That Re-afforestation Would Contribute More to the Development of New Zealand Than Would the Breaking-in of Virgin Land." Speakers: Affirmative, R. Pattisson (leader), B. Kay, and A. Nicholas; negative, F. James (leader), A. Harris, and M. Hughes. The judges, Messrs. Barnett and Dodson, awarded the decision to the negative team by a narrow margin. Thirty-two members present out of 58.

Te Pahu.—Decided to organise a "working bee" to clean up the Te Pahu tennis court for the use of the club. Lecture by Mr. G. McIntosh, inspector of stock, on "Diseases of Livestock." Twenty members present out of 27.

BAY OF PLENTY.

Kati Kati.—Arrangements for a debate against the local high school. Mr. C. Grainger gave a very interesting account of the 2nd N.Z.E.F. in Syria; he showed a wide range of photographs, taken by himself. Two new members enrolled. Fifteen present out of 28.

Te Puna.—Business meeting. Eight members present out of 24.

Waimana.—Arrangements for a field day to be held in connection with the judging of calves at the Waimana and Nukuhou Schools. Address by Mr. Meliver on his visit to the Ruakura Animal Research Station; this proved particularly interesting to the junior members. There was an attendance of 10 members out of 24.

Welcome Bay.—Dance committee set up to finalise arrangements for a dance at the Papamoa Hall. Suggestions received for programme of club activities. A returned member, J. S. Ream, gave a very interesting talk on his experiences in the Pacific; he also displayed a number of souvenirs. Twenty members present out of 23.

AUCKLAND.

East Tamaki.—Arrangements for a field day at Westfield Freezing Co.'s works. Seven new members enrolled. Lecture by Mr. J. Valder, manager of the East Tamaki Dairy Co., who dealt with the qualities of milk and cream, and gave demonstrations of the testing of cream, whole milk, and skim milk. Twenty-nine members present out of 42. A field day was held in the previous month, comprising a visit to Messrs. McEwan's and Booth McDonald's factories. Very interesting demonstrations of the methods employed in the manufacture of farm implements were given, and a general tour of the factories revealed the latest developments in farm machinery of all descriptions. There were 30 club members in the party, together with 15 pupils from the Otahuhu Technical High School and the Howick High School.

THE GOOD NEIGHBOUR

THE DOORWAY OF THE YEAR

Do you know how January came by its name? It was called after one of the most important of the old Roman gods, Janus, the doorkeeper of heaven, the patron of peace and prosperous beginnings. Unlike his fellow-immortals Janus had two heads—the first white-haired and patriarchal looking, as befitted one who had knowledge of the past; the other young and handsome, denoting his connection with events yet to come. In his right hand he carried the key which opened the entrance to the future, and in religious ceremonies the first prayers were always offered up to him. Many shrines were built in his honour, the most famous of these buildings being known as Janus Quadrifons. The walls formed a complete square and each had one door and three windows, the doors symbolising the four seasons and the windows the twelve months of the year.

> *"Janus am I, oldest of potentates;*
> *Forward I look, and backward, and below*
> *I count, as god of avenues and gates,*
> *The years that through my portals come and go."*

Naturally the commencement of each new year was regarded as being specially sacred to Janus and occasioned much festivity and rejoicing.

We still celebrate the first of January and make all kinds of plans and good resolutions on that date, yet as we approach the doorway of the new year some of us may feel a little sad, perhaps, as we look back on the days that are gone and the meed of happiness and opportunity they held. But the future is already beckoning, and we must not allow thoughts of the past to hinder our going forward to new and better things. I am convinced that our dream of a better world need not remain a vague, nebulous desire, but can become a glorious reality if only we are prepared to devote the necessary thought and effort for its achievement.

It is no use saying, "I have no outstanding talents, no training. What possible good can I do, one among so many?" This kind of negative attitude gets us nowhere and is really a form of inverted pride which provides our conscience with a convenient excuse for not exerting ourselves in the service of others. Society is composed of individuals—whether it is a good society or not depends entirely on the character of the individuals within it. Jane Oliver, in her book, "The Hour of the Angel," comments: "The soul of a nation is blended from the ideals its people share, from their aspirations, their loves, their memories, and their faith, so material loss shall not touch it."

NOW is the time to put our ideals into practice, to exercise to the full those qualities of charity, honesty, comradeliness, and hard work—fundamentals all, if we are to attain progress in the home, the community, the country itself. Such a task is by no means lacking in difficulties—

> *"It takes great strength to bring your life up square*
> *With your accepted thought and hold it there,*
> *Resisting the inertia that drags back*
> *From new attempts to the old habits' track.*
> *It is so easy to drift back, to sink,*
> *So hard to live abreast of what you think."*

Yet how worthwhile the result if we keep faith with our resolve. The prayer of St. Francis of Assisi will surely help us in the accomplishing of our purpose: "Lord, make us instruments of Thy peace. Where there is hatred, let us sow love; where there is injury, pardon; where there is discord, union; where there is doubt, faith; where there is despair, hope; where there is darkness, light; where there is sadness, joy."

Mary

"When that great day comes...."

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CHILDREN'S LITERATURE

Its Place in the Democracy

By KATHLEEN M. NICHOLLS

AN essential instrument of education for participation in the government of any democracy is a free and abundant supply of good books. Education through reading can build for peace by helping to eliminate the problems that lead to wars, besides providing the material and stimulus to promote a more active participation in the democratic life.

A CHILD'S early efforts to find out how the world wags, satisfied through his reading, are of the utmost importance, and the answers he finds to his questions will remain with him through life. Therefore a hasty and purposeless choice of books to supply his information must be avoided at all costs.

Even the Very Young

Even in the case of the very young reader, a taste for fact and science as distinct from escapist literature, for books which provide guidance for the constructive use of leisure time, books on vocational guidance, and social studies of civil life and amenities can be cultivated. To bring us nearer the ideal of democracy, the right basic attitudes must be developed, and, as the idea of personal responsibility is the chief difference between a democratic and a totalitarian Government, children must be trained to accept the responsibilities of citizenship. Thus, through their reading, they can learn to ally themselves and their interests with the community. Our dependence on one another can be made obvious by presenting, in simple and sympathetic fashion, the various trades and callings represented in the community, and the people who work in them. There is today an abundance of children's books of this type, authentic, attractive, and graded to suit all age groups.

Cultural Tolerance

There exists in this present world of conflict a strong challenge to democracy, and our freedom must be fought for in schools and colleges as well as on the battlefield. Studying the history of two nations will throw much light on the reason for their inability to live together peaceably, and then remedies can be sought for their discord and disputes, remedies which will avoid plunging thousands of people into strife and violence. Children cannot realise too early that other races have customs and ways of life different from their own, and that these differences should not be treated as inferiorities. Understanding other nations through reading will help the child to know that discriminations of this kind have no place in a democratic country.

This cultural tolerance can be brought about, in the case of small children, by the reading of folk-lore, and the many excellent translations of children's stories by foreign writers. The need for a cosmopolitan knowledge of literature is especially great now, when members of our Armed Forces are returning home, bringing culture from other lands, and thus enriching our own literature. The power and importance of the printed word in influencing the minds and lives of a people was displayed to the whole world by the Nazis, who organised the large-scale destruction of books by democratic philosophers and champions of freedom and truth.

Constructive Attitude

The ability to come to grips with life, to make wise plans and choices, and to be independent in arranging his own entertainments, is an important factor in the child's training as a citizen, and this self-reliance and self-expression can be developed along desirable and wholesome lines through the provision of a wise selection of reading matter. Books can furnish useful material for such projects as juvenile discussion groups, which do much to promote in adult life a more constructive attitude to the affairs of a country. No one will deny that the cause of democracy, still in its infancy, is in need of active championship in its struggle against the threat of Fascism.

Today, when our young people are being compelled to face the realisation of the brutalities and crude realities of life at an age when they would normally be still in the land of make-believe, it is essential that their sense of security and inner peace should not be harshly violated, and that their confidence should not be blighted. Through the guidance of people with an expert knowledge of modern children's literature, truth can be made available for young people on a plane suited to their understanding.

Therefore those whose duty and privilege it is to supply the educational and cultural needs of the child today would do well to keep before them the realisation of their great responsibility, and the thought that books can develop resources of the spirit which will form the foundation for real freedom—a true democracy.

PROGRESS

He that would make real progress in knowledge must dedicate his age as well as youth, the latter growth as well as the first fruits, at the altar of truth.—Bishop Berkely.

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26 COOKERY EXPERTS REPORT ENTHUSIASTICALLY ON THE NEW BAKING POWDERS

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The sum total of their opinion was that as well as being better, the new phosphate baking powders are foolproof. For instance, when as much as 25% more than the correct amount was deliberately used in tests, the results were still successful, and there was none of the after-taste usually associated with an overdose of baking powder.

Without exception, all these experts were enthusiastic in their praise. They got better aeration, more even texture, the baking kept moist longer, but above all they were thrilled that they could leave the baking after mixing in the powder for long times without losing any rising. Phosphate Baking Powders don't "act" till they are in the oven.

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○ Pure Food Phosphate for baking powder manufacture is a product of Albright & Wilson, and is distributed in New Zealand by Imperial Chemical Industries (N.Z.) Ltd., 16 The Terrace, Wellington.

Sojourn In China

HOUSEKEEPING is apt to be an arduous job at the best of times, but the war years, with their rationing and restricted supplies of many commodities, have added considerably to the housewife's burden. When we hear about the domestic difficulties in other countries, however, our own worries seem small in comparison. This was brought home to me very forcibly recently when I took tea with a friend newly arrived from inland China. As she helped herself to sugar she could not refrain from exclaiming at its whiteness.

"WE never saw any but the brown variety," she explained. "The colour provided an ideal means of camouflage for various impurities, such as dirt and sand, and even when the sugar appeared reasonably free from foreign matter, there was always a thick sediment in the bottom of the cups. The milk also suffered from adulteration, and when it became too blue then it was time to have a few words with the milkman. The best way of getting proper value for your money was to have the cow brought to the door and milked in front of you!"

Livestock Under Floor

Her first home was in the mountain city of Shihchuan, in the Shensi Province. A tiny whitewashed house with a red curved roof, it looked very picturesque set upon the green terraced cliffs rising steeply above the Han River. Actually, it was situated in surroundings far from ideal, for it had been built right upon the street, and the traffic sounds were clearly audible through the thin walls. The other houses crowded so close that there was literally no room for a garden, three pots of flowering shrubs having to suffice; and the entire structure was high enough off the ground for goats and pigs to roam at will underneath. The movements of the animals provided anything but a soothing accompaniment to slumber, and the neighbouring pork butcher had an unenviable habit of replenishing his supplies from the protesting livestock at 3 o'clock of a morning! She had not been in Shihchuan long before a cholera epidemic broke out, and later in the season there was a drought and snakes found their way indoors on several occasions. Once she just missed having one land on her head; it dropped from the rafters as she was crossing the room. The only drinking water procurable came from the river and had to be boiled before using, and you never ate any vegetables or green foods whatsoever unless they were cooked. And all fruit, even apples and grapes, had to be dipped in boiling water or permanganate of potash—only then was it safe to sample them.

By Any Other Name

The language, too, provided its share of problems, a noun sometimes having four or five different meanings, according to intonation. One day the joint was brought to the table wreathed in custard, owing to the use of the wrong inflexion when giving instructions concerning the gravy. It was fortunate that the cook-boy did not obey her quite so literally another time when she inadvertently ordered him to put the meat in the "donkey" instead of the oven, for the donkey plays an important part in the tilling of the soil in this part of the world. Tractors are unknown and all the ploughing is done by means of donkeys and oxen, the two often being yoked together. The people are industrious and home-loving and have a high regard for family life. The children are jolly, friendly youngsters with pigtailed hair and adornments of charms and amulets to ensure the cycle of life remaining unbroken. Small boys are often dressed as girls to deceive the evil spirits. New Year is the great holiday festival, when shops are closed and work is at a standstill while every household gives itself up to merrymaking. It is bother enough catering for the customary three or four days' holiday with which we begin the year in this country—just imagine having to get in sufficient food to last for 15 days, the usual length of this festival in China.

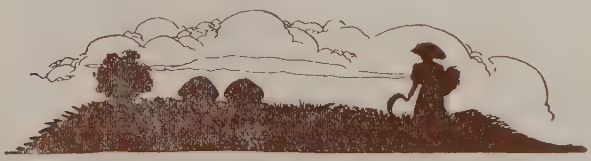
Time—A Poem from the Chinese

In youth how easy, but in age how hard
It is to learn.
A single golden inch of time, they say,
You should not spurn.
If spring be drowsed away
On the edge of life's green pool,
Before you realise
Red leaves begin to fall,
Autumn's brief day grows cool,
Mist dims the eyes.

—Lu Fang-weng.

Travellers' Joys

Transport in the interior is exceedingly primitive. Rickshaws, of course, can be hired in the city, but folk wishing to cover longer distances are catered for by a meagre fleet of lorries, ramshackle in the extreme and wholly untrustworthy where the brakes are concerned. Apparently no rules are in operation regarding overloading, and as there are always numerous people travelling it is quite an ordinary occurrence for a moderate-sized vehicle to carry as many as 30 passengers perched on top of the



mountainous piles of luggage. Junks with their moth-like sails are available for river journeys, but the safest mode of travel is to go overland in a bamboo litter borne by two sturdy bearers, although the maximum rate of progress by this method is only 30 miles a day. Babies or young children are carried in round baskets suspended from a pole across the shoulders of the coolie, who usually balances his human load by filling the second basket with vegetables or other foodstuffs.

The people in the wayside villages prize western articles very dearly. The owner of a felt hat or a scarf, for instance, would never dream of wearing them save on special occasions, preferring to hang them in a prominent position on the wall for visitors to admire. Spectacles are also valued possessions, and you will often see them on the more sophisticated, although the lenses are frequently made of window-glass.

Under Aerial Attack

My friend's next domicile was Hanchung, in the southern part of the province. Here she lived through nearly three years of incessant aerial attacks from Japanese invaders. Like most inland cities Hanchung was surrounded by a huge stone wall, the only exit being afforded by four gateways set at intervals in the wall. It had no defences against assault from the air, and when the enemy planes came over the entire population—men, women, and children—rushed for the gates, hoping to reach the shelter of the fields beyond the town. Sometimes it was necessary to stay outside all day, with only the wheat stubble as protection from the blazing sun and no food and no certainty that either you or your home would survive the ruthless marksmanship of the enemy. After months of such experiences and several narrow escapes from being badly crushed by a panic-stricken crowd, my friend decided that it was less dangerous to stay in her own compound, so a trench about four feet deep was dug in the middle of a bamboo clump, and there she took refuge whenever the planes sounded overhead. The ground shook and the leaves danced as if electrified, but she and her family were preserved from injury, even when a bomb made a thirty-foot crater in a nearby garden and blew its flowering peach trees into the next street. She paid sincere tribute to her cook boy, who stayed at his post instead of fleeing with the other servants. Only when a raid was at its worst did he take cover under the kitchen table; otherwise he went on with his preparations for a meal. Nor did he take umbrage at the continual influx of visitors, for, Hanchung being situated on the main Burma highway, residents offered whatever hospitality they could to travellers, and at a conservative estimate my friend's list of house guests during that period numbered well over 200.

When it came to her turn to move on she and her household travelled the thousand miles to their destination, the Borden Memorial Hospital in the north-west province of Kansu, by lorry with an R.A.F. convoy. This hospital, endowed by an American millionaire and named after him, is situated in the capital of the province, Lanchow, that vast metropolis where representatives of almost every race in the world congregate. An average of 10,000 patients a year receive treatment at the hospital, and many of them are taught how to make footwear or furniture or grow flowers, as the case may be: a practical application of modern occupational therapy. A leprosarium has also been established for those suffering from this dread scourge. Hospital discipline has little effect on the habits of the Tibetan inmates. These nomadic tribesmen are invariably distrustful of foreign doctors and medicine, and though they gain sufficient confidence to enter the ward, they rarely remain in bed the prescribed time, but insist on getting up and rejoining their wandering kinsfolk.

Culinary Juggling

The diet of the European patients formed my friend's particular charge, and she had to plan her menus according to the foods available. Fortunately there was an abundance of vegetables and fruit (except the citrus variety), and, while regretting the fact that eggs were not furnished with birth certificates, she soon learned the value of adding chopped onions to scrambled eggs, for instance, on the principle of one strong flavour disguising another! Beef, pork, and mutton were plentiful, but no butter and other tinned goods were to be had, and coffee consisted of an ersatz mixture of roasted bran and malt. You could make peanut butter if you were so inclined, as peanuts formed one of the staple crops, and cereals were also obtainable, though not done up in the neat packages to which we are accustomed. All the flour was ground by hand, and if you wanted rolled oats for breakfast you had to send a boy up into the mountains to collect them, and then they had to be washed, husked, and dried. After the final processes of sifting and grinding you could start to get your porridge ready. Cooking was largely a matter of adapting your recipes to suit the local ingredients—a true test of culinary ability! The hospital day began at 5 a.m., the staff accomplishing several hours' work before breakfast, but as there was no electricity (oil lamps provided the sole means of illumination), everyone retired for the night correspondingly early, the usual bedtime being 8 o'clock.

All water had to be carried from the river, and donkeys were used to transport it up the precipitous slopes, and as the vendors levied a charge of one dollar for every two buckets, care was taken not to waste any. What small surplus remained was saved for the garden, where tomatoes and lettuce were cultivated to supplement the vegetable supply. The soil, being of the loess type, absorbed moisture like blotting paper, and there was never enough water to spare to give the ground the thorough soaking it needed in order to produce the best results.

In striking contrast to former journeys her return to civilisation (via Chungking and thence to India) was accomplished by plane in a few hours. Though a comparatively brief trip, it was not lacking in hazards, for no less than seven transport planes had been shot down the previous week and the Himalayan mountain region is one of the most dangerous air routes in the world. However, the fates were kind and they arrived in Calcutta without mishap. The greatest shock my friend sustained was when she viewed the current styles—after spending so many years in the interior of China, minus periodicals or pattern books, she found the fashions so changed as to be almost incredible. She was not daunted for long, and no bride choosing a trousseau could have felt a bigger thrill than my friend when she bought her first new hat in seven years!

Chinese Proverbs

A journey of a thousand miles begins with one step.

The gods cannot help a man who loses opportunities.

If you don't scale the mountains you can't see the plain.

"Resolutions for the New Year"

THE ideals which "Bry," Eltham, embodies in her list of New Year resolutions are such as will render those who live up to them "Good Neighbours" in the highest sense of the term. The second prize is shared by "Cloudy," Ashburton, and "Mac," Auckland.

First Prize

THE years have proved that those grand-sounding "I resolves" rashly connected with writing a novel, learning a foreign language, or becoming a champion swimmer were but frail, fanciful hopes. However, for the coming New Year I shall still very optimistically make resolutions, but these will be governed by personal failings and possible personal attainments.

Thus, Resolution No. 1 will be framed to slay forever that embarrassing bogy that haunts me so persistently—Unpunctuality. Then, like Lord Nelson, I shall be able to make virtuous allusion to spare quarter hours.

CREED

God be in my head and in my understanding.
God be in mine eyes and in my looking.
God be in my mouth and in my speaking.
God be in mine heart and in my thinking.
God be at my end and in my departing.

—Fifteenth Century.

Secondly, I shall determine to become more aware of important happenings and world affairs. This broadening knowledge shall be gained by reading and studying the daily paper and good books more attentively and by listening to well-informed people.

And my third resolution. I once read that we are willing to pay the "pounds and shillings" of service (that is, the larger demands of living), but we ignore or forget the "pennies"—the little unseen courtesies and small everyday kindnesses. I will resolve to remember the "pennies" and so learn the "excellence of the ordinary."

Lastly, I want to cultivate the art of appreciation, that I may "see" properly my many blessings and be thankful. This will be Resolution No. 4.

For me, 1945 will be successful and happy if I embody in my pattern of living these four resolutions—achieved. **—"Bry," Eltham.**

Second Prize (Equal)

IT is not my practice to make many resolutions, as I consider it better to make one or two and do my best to keep them.

My main resolution for this New Year arises from the fact that the members of my family are growing up and it behoves me to guard against my fault of being over critical. Therefore, in the future, when discussing any person and I find myself saying something unfavourable, even if truthfully, I shall endeavour to say at least two good things about that person.

My next resolution is to take time to write something, express some thought every day. My last resolution is to read less, to read more slowly, and not to skip through articles and books.—**"Cloudy," Ashburton.**

Second Prize (Equal)

DO you think that there is somewhere, a last resting-place, for all things formulated but never fulfilled—those wishes we've wished and resolutions we've resolved? If there is, I for one sincerely hope that I shall never be confronted with them, and yet, every New Year I firmly resolve afresh to mend my ways, to take advantage of this gift of newness which allows me another chance. But by now I know myself too well to expect myself to change overnight and so I must prefix all my resolutions with that elastic word "try." So I resolve:

To try not to be irritated into being nastily snobbish towards people whose speech annoys me—one of my major social failings.

To try to read the newspaper every day, so that I shall have an inkling of at least half the current events instead of feeling blank and hoping I look intelligent during a topical conversation.

To try to read a verse of poetry or a small passage of good prose before going to sleep, and to take time out to listen, really listen, to at least one good record each day.

To try to get up early—an old-timer, this one.

To try to make time to lie in the sun, weather permitting, and walk in the fresh air one day a week.

To try to keep up my correspondence—this is an old one, too, but I have improved, so it may as well go back on the list.

To try to think before I speak.

Of what use would be the finest plan for a new order unless we are willing to re-order ourselves? And these small things which I resolve to try to carry out should help to make me a more acceptable member of the human race, having learnt to dismiss trivialities by surmounting them and thus allowing myself time and thought to expend on others.—**"Mac," Auckland.**

I RESOLVE—never to neglect my friends, as true friendship is one's most valuable possession. I resolve—to strive in every possible way to do my best for the war effort so that the much-longed-for peace will bless the earth very soon.—**"Ena."**

MY resolution for the New Year is to buy a diary and write down in it all the books I read. There are so many books which can be a help to us in our daily lives. The ones that interest me most are on gardening, bee-keeping, toy-making, hobbies, travel, and modern fiction.—**"Sanstead".**

I'LL try not to get low-spirited and blue,
Or get upset and fume and stew.
I'll not be snappy,
But bright and happy,—
I'll be a good neighbour the whole year through.

—"Ladybird."

Competitions

FEBRUARY

The closing date for the current competition, "What I Pride Myself on Doing Best," is February 15.

MARCH

Most of you are keen readers, I know, so here is a competition in which you all can join. In your reading what books do you consider outstanding? Best-sellers or biography; practical subjects or poetry; adventure tales or anthologies—I wonder what type of literature has most appeal for country readers? So that your lists will contain only these volumes which have really impressed you, I suggest you limit your choice to 15 titles.

"15 OUTSTANDING BOOKS."

First prize is 10/- and the second prize 5/-. Entries are due on March 15.

"MARY,"
C/o "Journal of Agriculture,"
P.O. Box 3004, Wellington.

EVEN if we failed last year we must try again by doing a little stocktaking and following that up with more determined resolution. Everything begins in the mind. Our thoughts bring actions and actions form habits and habits make character. I resolve to endeavour to adhere more closely to the Ten Commandments.—**"R.W.C."**

THE following are my "Resolutions for the New Year":—

To try—

(1) To develop a better sense of humour.

(2) To be more tolerant.

(3) To overcome my bad habits and thus set an example to my children.

(4) Not to cross my bridges until I come to them.

(5) To make new friends and keep the old ones.

(6) Not to make mountains out of molehills.

(7) To speak quietly and say less.

—**"Leila."**

MY great resolution will be ever to remember that the great deliverance of our world is not to be achieved without cost. The price paid is colossal and of those who serve, as well as those who died for us, let it be said:

"All the soul
Of man is resolution which expires
Never from valiant men till their last breath."

So would I strive to live my new year without complaint concerning petty troubles. I would have the courage to count my many blessings instead of demeaning them.—**"Roundabout."**

"ONLY one life to live today—
Then live it well.
The good one kindly deed can do
Who can tell."

—**"Marguerite."**

PRAYER

For those who can't be up and doing I'd like to quote a few lines from Virma Shearer's lovely poem "At Midnight":—

"Turn Thou our thoughts, dear Lord . . . .
Quiet the time-worn questions that are all unanswered yet.
Take from the spent and troubled souls of us their vain regret.
And lead us far unto Thy silent land
That we may go—like children—out across the field of dreams."

"Tiggetty Boo," Katikati.

"BLUES CABINET."

MY city cousin has in her bathroom a "Blues Cabinet" and in it she keeps a luxuriant bath refresher of pine needle bath salts, also talc and perfume. I've enquired at my chemist's and it is wonderful the array he can produce for my inspection. There's something in her idea, for when one's person is sweet and refreshed it does much towards enlivening one's mental outlook. Another tonic is to put on your bonnet and lipstick, and visit a neighbour, a store, or go for the mail—anything—so long as it is out of your ordinary routine. Be sure to speak to someone. It works like magic! You are bound to pick up a fresh knitting stitch or discover a different way of making a sponge—something new, at any rate. Wherever we live, whatever we do, there is always someone worse off than ourselves. If we go out and help or advise others we will feel all the happier, for it is the surest and quickest way of forgetting our gloomy selves.—**"W.G.," Victoria, Australia.**

The Owl

When the flowers their petals close,
And the world is all asleep,
Then a hunter hunting goes
All among the shadows deep.
Hooting through the woods, he flies
On his wide and silent wings,
Blinking with his solemn eyes,
Thinking solemn kinds of things.

—G. M. Tuffley.

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That Tired Feeling

Contributed by
The Department of Health

MOST of us know what it is to be really tired, to be really done-in after a long tramp, or some other healthy outdoor exercise. It's a very pleasant feeling, too, when one is able to relax properly, and invariably it guarantees a sound night's sleep—refreshing and healthful. That form of fatigue is normal. But there's another kind that's not so normal—that kind of tiredness of which the chief features are irritability, headaches, poor appetite, disinclination to start in any new job. It is definitely harmful, and arises from two causes—1, ignorance of the nature and cause of fatigue, and, 2, neglect of the ordinary laws of health.

Accumulation of Toxins

At one time it was thought that fatigue was due solely to the exhaustion of potential energy, but it's now realised that that tired feeling is the result mainly of the accumulation of fatigue products, or toxins, as they are called, in the body.

Let's have a look at how these toxins are produced. As everyone knows bodily activity is the result of certain chemical changes in the muscles. There is stored up in our muscles an animal starch known as glycogen. This is a substance of high potential energy. When the muscles are contracted it's broken up into what is known as lactic acid, and this in turn is transformed into sugar. At the same time carbon dioxide is given off and carried by the blood stream to the lungs, where it is expired.

INTENTIONS

Properly speaking, everything depends on a man's intentions. Where these exist, thought will likewise appear; and as the intentions are, so are the thoughts. —Goethe.

These are the fatigue products—in other words, they are the result of the chemical changes in the muscles that have been called upon to perform work. When the muscle ceases to contract certain glandular secretions become active, and restore the lactic acid and sugar into glycogen. If this restoration process is not satisfactory, there will be an accumulation of waste products, and concurrently a feeling of fatigue.

Then we have mental fatigue, which, in its causes, is similar to muscular fatigue. That is to say, it's due partly to the using up of the potential energy of the nerve cells and partly to the clogging of these nerve cells by waste products, which are the result of excessive mental activity. It becomes a problem, then, of removing the waste more expeditiously. In the first place good circulation is essential, because the blood has much to do with the removal of the toxins.

Basis of Good Health

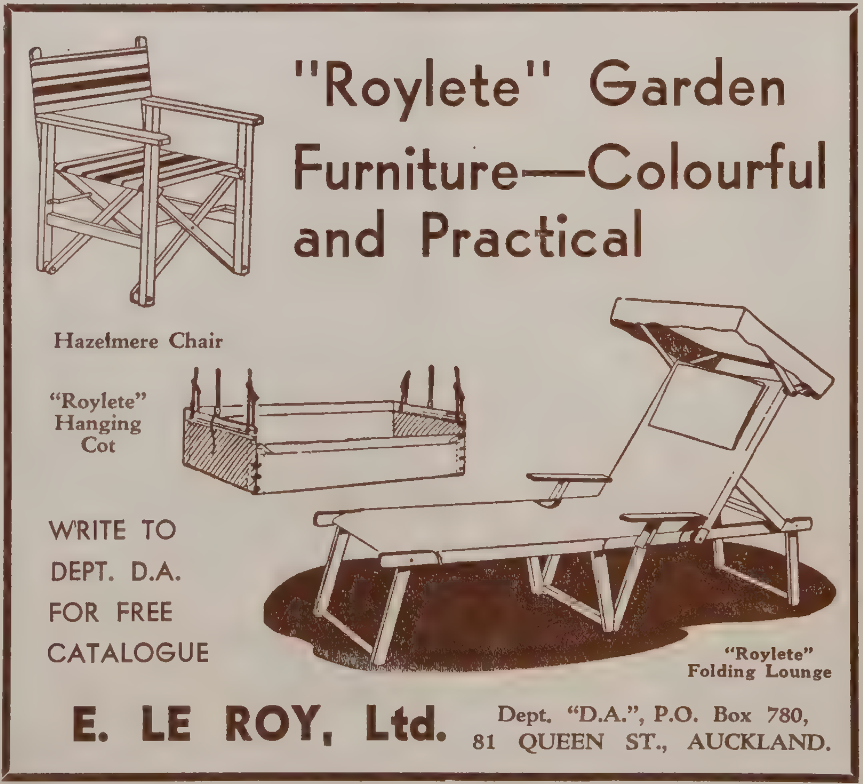
But there are three other considerations in this problem, and fundamentally they are the basis of all good health. They are: Proper food, adequate ventilation, and sunshine.

Let's look at them under their separate headings. First of all, it is essential that we eat nourishing food, in order to enrich the blood and supply the body with all those food factors such as vitamins, proteins, carbohydrates, minerals, and so on that we need so much. Moreover, good food —that is, proper food—always brings with it a sense of well-being, and it's an excellent antidote to those nervous complaints that frequently interfere with the regular functioning of the bodily organs.

Then there's ventilation—good ventilation will improve the circulation of the blood—and those who work inside should take particular note of this point. A current of cool air, by cooling the surface of the body, contracts the blood vessels and in consequence more blood is supplied to the internal organs. Also, the freshness of the air stimulates deep breathing, and this in turn stimulates circulation, and encourages the more rapid removal of the fatigue products.

Finally, we have sunshine. In the counteracting of fatigue sunlight is important. The ultra-violet rays of the sun enrich the blood, kill infection, give vitality, and assist the normal functioning of the body.

Bear in mind that abnormal fatigue is an unnatural state, due largely to ill health. It should be investigated without delay. This undesirable condition, however, can be avoided. It is simply a question of seeing that your body gets good food, fresh air, and sunlight—three ingredients that help to make life useful and pleasant.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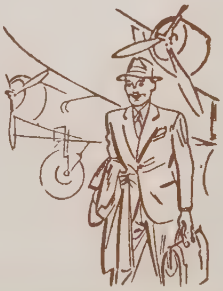
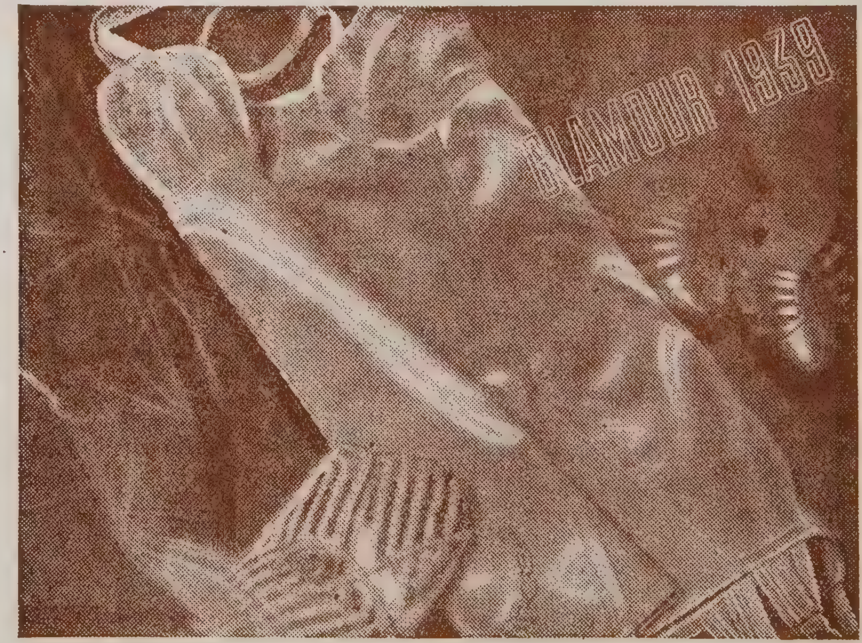


A Berlei executive is in America now, investigating the synthetic rubber and fabric situation. We're all set to pick up where we left off—at nylon, remember? When the whistle blows, we'll shower you, overpower you with lovely limber Berleis beyond your dreams. We'll have you looking your most beautiful for "him" to come home to. It's a promise!



Berlei
TRUE-TO-TYPE FOUNDATIONS

Some Grape Recipes

VINES grown in home gardens or small private greenhouses are frequently prolific producers, and often the crop comes to maturity in too great abundance for the best or most profitable use to be made of the fruit. The following recipes have been compiled by an officer of the Department of Agriculture to assist those fortunate enough in producing an abundance of grapes to prepare them in a variety of ways, some of which will mean spreading the enjoyment of their delicious flavour over into those periods of the year when they are otherwise "out of season."

GRAPE JELLY.

Crush some nearly ripe grapes. Place them in a shallow aluminium or enamel pan, cook slowly, stirring till they are well mashed, and the juice separates freely. Boil for a minute or two, then pour the pulp into a double wet cheesecloth. Tie it, and hang it up to drain until cool, when a little pressure or twisting of the cloth round will extract some more of the juice. Add a little water to the pulp, cook it, and strain it again, and add the second juice to the first. The juice of the first straining gives the finest quality jelly, and can be used alone if desired.

To each pint of juice add 1lb. of sugar. Bring it to the boil, and when it flakes on the uplifted spoon or jellies on the edge of the pan, run it into hot jars. Cool quickly, but avoid draughts, which would cause the jars to crack. Cover with paraffin wax, fix the covers, and store in a dark cupboard. When the wax is cold run a knife dipped in hot wax between the glass and the jelly just below the surface; this will ensure a perfect seal.

The usual causes of failure in making jelly are an excess of sugar, a lack of acidity and pectin, and over-boiling, which converts the pectin.

If the fruit juice is not decidedly tart, either lemon juice or citric or tartaric acid crystals can be added.

In case of non-setting from a lack of pectin in over-ripe grapes, the juice from green apples sliced and stewed with their skins, pips, and cores for 10 to 15 minutes can be added in the proportion of one measure of apple juice to two of grape juice.

To ascertain whether the grape juice contains enough pectin to jell properly, mix a spoonful of juice with a spoonful of methylated spirits. A large lump of jelly is formed when there is sufficient, but if only a few strings or flakes are formed the juice is lacking in pectin.

Albany Surprise grapes are well supplied with pectin and make both excellent jam and jelly. Some of the European varieties, especially when they are on the ripe side, contain less pectin.

Before attempting to make large quantities of grape jelly it is advisable to prepare small samples and note the results.

SPICED GRAPES.

Pulp 4 qts. of Albany Surprise grapes, boil for 5 minutes, and skim off the seeds, which crush and place in a muslin bag with one teaspoonful each of bruised cloves, cinnamon, and allspice. Place the bag of spices in a pint of vinegar and boil it for 15 minutes. Add the vinegar with 3lb. of sugar to the pulped grapes, and cook the whole till thick.

Run into hot jars and seal.

PICKLED GRAPES.

Take nearly ripe, firm-fleshed grapes (Golden Queen, for instance), and pack them into jars. Boil 1oz. of peppercorns, 2 doz. cloves, and 2oz. of ginger root (all bruised) in a gallon of vinegar for 15 minutes. When cold pour the vinegar over the grapes, covering them well to allow for absorption. A week later pour off the vinegar, boil it again, and return it when cold to the grapes.

Ready for use in about a month.

GRAPE AND PEAR JAM (FRENCH RECIPE).

Proportions: 2lb. ripe grapes and 1lb. pears to 1lb. sugar.

Prepare the pears the previous evening; peel, cut into quarters, and take the cores out. Cover them with powdered sugar and leave them till the morning. Seed the grapes with a quill (or skim them off). Cook on a slow fire for approximately one hour.

GRAPE JAM (FRENCH RECIPE).

Seed the grapes, and to each 1lb. add ½lb. of sugar. Cook on a slow fire for an hour, stirring. Try if a spot of jam between thumb and finger will form a thread. If so, the jam is cooked. If the grapes are previously crushed, the seeds can be skimmed off during the cooking.

GRAPE PIE.

Wash, stem, and seed some nearly ripe Golden Queen or other firm-fleshed variety of grapes. Pile them high in the middle of the dish, scatter some sugar over them, and cover with a light crust. Cook for about three-quarters of an hour. Serve with cream.

APPLE AND GRAPE TART.

Partly cook the apples, then add a cupful of grapes to an ordinary pie-dish of apples.

STEWED GRAPES.

1lb. of grapes, ¼lb. of sugar, and ½ tumbler of water. Seed the grapes. Boil the sugar and water, add the grapes, and bring the whole well to the boil, then pour it out into a dish and let it cool.

Grapes can also be used in jellies, fruit and vegetable salads, etc.

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GOODYEAR TYRES

"The Spinners of Silk"

READERS of that slender volume, "Etching of a Tormented Age," wherein Hsaio Chi'en reviewed so capably the effect of the Kuomintang on the contemporary literature of China, will enjoy this new collection of stories from his pen. The author—an editor of note and for several years lecturer in Chinese at the School of Oriental and African Studies in London—is also responsible for the translating of his sketches from the Chinese originals.

His style is both poetic and realistic. In his first tale, "A Rainy Evening," the beauty of the descriptive passages concerning the storm "when it seemed that the world was drenched in vertical rivers of rain with watery flowers budding and blooming in their midst," stands out in sharp contrast to the old peasant's callous treatment of the poor, mad woman who sought to shelter in his hut from the downpour. In another tale, he achieves a similar effect by means of characterisation, accentuating very cleverly the difference between the affectionate, peaceable, music-loving lad and the girl student whose interest in politics changed her overnight from a "pretty little squirrel" into a fanatical patriot concerned only with her country's destiny. His sympathy with the oppressed is clearly shown in "The Philatelist," which concerns a heedless youth who, through the hobby of stamp collecting, is gradually awakened to the tragedy that overtook his countrymen when the Province of Manchuria was invaded by the Japanese.

A Chinese Poem

A mist-cloud hanging at the river's brim,
Pink almond flowers along the purple bough,
A hut rose-girdled under moon-swept skies,
A painted bridge half-seen in shadows dim—
These are the splendours of the poor, and thou,
O wine of Spring, the vintage of the wise!

Hsaio Chi'en is at his best when writing of youth. The study of Seventh Master and his little dog, Hwatse, and Old Hwang the servant, who, in trying to save the doomed animal, himself becomes infected with rabies, is particularly appealing; likewise the title story depicting two young people's first essay at keeping silkworms. The complete cycle of these tiny creatures' lives is set forth in exquisite detail. He writes of the spinners who like to weave their fairy-like threads about the face of their mistress: "Perhaps they took Mei's eyes for willow-ponds, her lashes for a river-bank with reeds growing, her brows a bluish upland, her hair a black forest. The flower she wore would be the moon or an ancient well in a dark forest."

The same note of fantasy permeates his account of the celebrations of the Lantern Festival and the capitulation of the arrogant boy leader, Iron Pillar, to the charms of the thirteen-year-old Leelee when he witnesses her anguish at the loss of her pet cat, which he has taken captive.

The most moving story of all centres round the old proverb, "Bend down when your eaves are low." The portrait of the widow who sacrifices the last of her treasures that her little son may share in some of the boyish pleasures so taken for granted by his more fortunate school companions is typical of Hsaio Chi'en's deep compassion for all who know poverty and suffering.

Mary's at Home

WE have been busy settling into a country "cottage"—it is a very old and sadly-neglected place, but we are having lots of fun putting it in order. If you popped in for a cup of tea, you would most likely find me with a paintbrush in my hand! The country here is rather open and bare, but the fields are wonderfully green and daisies grow there (very red-lashed ones), and there's a hill at our back door, and a poplar tree, thrush, and blackbird to wake us at dawn, grey dusk flying over, the ever-changing wonder of the Southern Alps beyond Lake Ellesmere (they have a new mood and a new colour every day), so we are rich, indeed. If you came here early in the morning you would find a dewdrop on every grass-blade, clover with folded hands, and a wind-song in the pines.—**"Tinkle Tinkle."**

MAY I join your At Home? The lilacs have been breath-taking in their loveliness this season, the air being drenched with their delicate perfume on sunny days. Their beauty is all too evanescent, like that of the butterflies which coquette among the profusion of bloom.—**"Cloudy."**

HERE is a thought I would like to pass on: "With a few flowers in my garden, half a dozen pictures, and some books, I live without envy."—**"Squib."**

I DO enjoy your letter and pages each month. The "Good Neighbour" Circle is a great idea—one learns how others overcome their difficulties and enters into their joys and fun, bringing one nearer to the lives of others. I think the "Journal" is one of the steps towards making a new order. It broadens our outlook and uplifts us, and we learn how greatly we are dependent on one another. No man can live to himself.—**"Noel."**

Look To This Day

"Why comest Thou?" asked the Pilgrim.

"I bring thee a gift," replied the Stranger.

"Thou hast a homely face," said the Pilgrim doubtfully.

"Kings come not dizened with gold and jewels." The Stranger spoke quietly; the light in his eyes glowed more brightly as he continued: "Though I come in lowly guise, not the kings of the earth—no, not even the gods of old possess such power as I."

"I am afraid," said the Pilgrim, awed by the strange beauty in the Stranger's face, discerned for the first time.

"Thou dost well to be afraid," the Stranger replied, "for I am the NEW DAY, and if thou dost not use the gifts I bring, silently will I depart, my secrets untold, and my treasures unrevealed.

"Look to this day,
For it is life—the very life of life.
In its brief course lie all the
Varieties and realities of your existence:
The bliss of growth,
The glory of action,
The splendour of beauty.
For yesterday is but a dream
And to-morrow is only a vision,
But to-day well-lived makes
Every yesterday a dream of happiness,
And every to-morrow a vision of hope.
Look well therefore to this day!
Such is the salutation of the dawn."

—From the Sanskrit.

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SALADS

SUMMERTIME is salad time. The plentiful supply of garden produce at this season of the year offers us every opportunity to try out all manner of delightful combinations of fruit and vegetables. Serve them with cheese, fish, eggs, lentils, nuts, or other forms of protein, and you will have a meal which is not only attractive and appetising, but well balanced from a dietetic point of view. For raw salads rank high on the list of protective foods, since they contain so many mineral salts and vitamins. They are particularly rich in vitamin C, which is easily destroyed by cooking, so if you eat a green salad every day you will be sure of getting a proper supply of this vitamin. Parsley is not merely a decorative accompaniment to salads, but is very health-giving where vitamins are concerned, and other ingredients which can be utilised with success include mint, mustard and cress, dandelion, and nasturium leaves.

Cooked vegetables can be used to advantage in salads, and this forms a pleasant change from the usual ways of serving them. For example, spinach gains added interest when pressed into tiny moulds and then turned out and arranged on lettuce leaves and topped with carrot "curls" and tomato dressing. Do you know how to make these curls? Thin, thin slivers of carrot dropped into ice-cold water till they curl at the ends. Celery can be treated in a similar manner, dividing the long stems into suitable lengths, and then cutting them longwise to within an inch of the base. Radishes should have five or six downward slits made in them before placing them in cold water to open into rosettes.

Vary your salad dressings as much as possible—don't serve the same one day after day. A small quantity of curry powder (¼ teaspoon) will improve a dressing lacking in piquancy. Here are several good recipes which will add zest to your salads:—

BOILED DRESSING.

1 tablespoon melted butter, 1 tablespoon sugar, 1 teaspoon mustard, ½ teaspoon salt, ¼ teaspoon pepper, 1 egg, ½ cup vinegar.

Mix the dry ingredients well together, then add the beaten egg and melted butter. Stir in the vinegar gradually and cook in a double pan over boiling water until the mixture is thick. Keep stirring all the time and do not allow the dressing to boil. Add a little milk when ready for use.

MAYONNAISE.

2 eggs, salt, pepper, mustard, vinegar, or lemon juice, 1 small cup salad oil.

Take the yolks of two eggs and mix with salt, pepper, and mustard to taste, and then add some of the salad oil, drop by drop. As the mixture begins to thicken, beat well, and add the oil in larger quantities. Mix in the vinegar or lemon juice last of all.

TOMATO DRESSING.

½ pint tomato juice, 2 tablespoons lemon juice, 1 teaspoon salt, ½ teaspoon mustard, 1 teaspoon grated onion, 2 tablespoons salad oil.

Mix the mustard and add with the salt and grated onion to the tomato juice. Then blend in the lemon juice and salad oil, and beat the mixture well with a rotary beater.

CHIFFONADE DRESSING.

1 egg, 1 teaspoon chives, 1 teaspoon salt, ¼ teaspoon pepper, ½ cup oil, 4 tablespoons vinegar.

Hard boil the egg and place it in a glass jar with the chopped chives, seasoning, oil, and vinegar. Chill and just before serving shake thoroughly.

BEETROOT SALAD.

Beetroot, walnuts, potatoes, parsley, and mayonnaise.

Cook the beetroot in the usual way, then remove the skins. Use a sharp knife or vegetable corer, and take out as much of the centres as possible. Dice some cooked potatoes, add finely-chopped parsley and walnuts, and toss well together. Then fill the beets with this mixture. Pour mayonnaise over and serve.

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CREAM DRESSING.

Condensed milk, seasoning, vinegar, or lemon juice.

To every three tablespoons condensed milk allow 1 tablespoon vinegar or lemon juice, ½ teaspoon mustard, and ¼ teaspoon salt. Blend all together. (If unsweetened milk is used it will be necessary to add 2 teaspoons sugar to this quantity of dressing.)

CRAYFISH SALAD.

½ cup rice, 1 cup crayfish (flaked), 1 tablespoon chives, 1 tablespoon lemon juice, pickle (optional), 1 cup cauliflower, lettuce, chiffonade dressing.

Cook the rice in water, strain the liquid off, and cool. Flake the crayfish, add the chopped chives and 1 tablespoon chopped pickles, and combine with the cauliflower, which has been divided into small pieces. Lastly, mix in the lemon juice. Arrange on a bed of shredded lettuce or on separate lettuce leaves, and serve with chiffonade dressing.

FISH SALAD.

½lb boiled white fish, 1 cup liquid in which fish has been cooked, 1 dessertspoon gelatine, 1 tablespoon vinegar, 2 tablespoons milk, 2 dessertspoons grated cheese, lettuce, watercress, carrots.

Remove bones from the fish and flake it. Heat the fish liquor, dissolve the gelatine in it, add the milk, and mix in the fish. Season well and add the cheese and vinegar. Pour into cups or small moulds to set. Serve on a salad platter with lettuce, watercress, and shredded carrots.

APPLE, CELERY, AND RAISIN SALAD.

2 cups diced apples, ½ cup diced celery, 1 cup raisins or sultanas, lettuce.

Mix the diced apples and celery with the raisins and serve on lettuce with the following dressing:—Mix together 2 tablespoons sugar, ¼ teaspoon salt, and ½ teaspoon mustard, then beat in an egg and add one-third cup milk. Bring to the boil, stirring all the time. Now pour ½ cup vinegar in gradually and continue cooking until the mixture is thick. Garnish the salad with pieces of imitation cherries.

JELLIED SALAD.

2 dessertspoons gelatine, ¾ pint hot water, 2 tablespoons tomato sauce, 1 cup green peas, 1 hard-boiled egg, salt and pepper, ½ cup diced carrots, ½lb cooked pork sausages. Skin and slice the sausages. Dissolve the gelatine in the hot water, add salt and pepper to taste, and the tomato sauce. Pour a little in the bottom of a mould and when firm cover with sliced hard-boiled egg and pour in a little more of the jelly to cover it. Arrange the sausages in the mould in alternate layers with the peas and carrots and then pour in the rest of the liquid. When set serve in slices with lettuce.

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GRAPEFRUIT SALAD.

Grapefruit, lettuce, or watercress, walnuts, lemon jelly.

Peel the grapefruit and divide in segments. Spread them fanwise on a bed of cress or lettuce and decorate with spoonfuls of lemon jelly and chopped walnuts.

SAUSAGE SALAD.

Sausages, cucumber, tomato, lettuce, celery, 2 tablespoons chives, 1 cup macaroni, 1 teaspoon salt.

Cook the macaroni in salted water and drain. When the sausages are cooked skin them and cut into slices. Shred the lettuce and place in a bowl, then add a layer of sliced tomatoes, 2 tablespoons finely-chopped chives, and a layer of diced celery and cucumber. The macaroni should come next and finally the slices of sausage. Serve with a lemon dressing.

FLORENTINE SALAD.

Cauliflower, leeks, cucumber, beans, lettuce.

Cook the cauliflower, beans, and leeks. (An onion can be used in place of the leeks if preferred.) Break the cauliflower in flowerets, chop the leeks, and add the beans. Sprinkle with salt and pepper. Fill lettuce leaves with the vegetable and arrange in a salad bowl. Serve with cream dressing.

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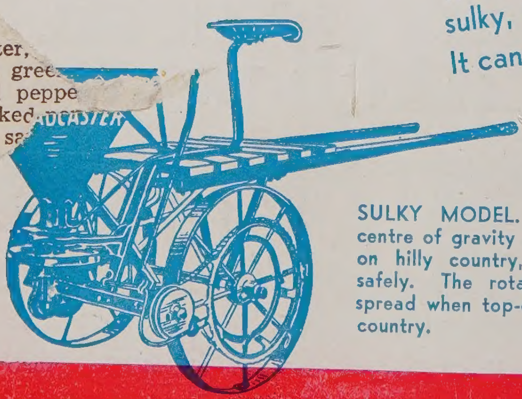

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